

**UNITED STATES DEPARTMENT OF THE INTERIOR  
BUREAU OF LAND MANAGEMENT  
SALEM DISTRICT OFFICE  
MARYS PEAK RESOURCE AREA**

**ENVIRONMENTAL ASSESSMENT AND FINDING OF NO SIGNIFICANT IMPACT  
FOR  
Klickitat Tie Late-Successional Reserve Enhancement Project**

EA NUMBER : OR-080-00-12  
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AREA ENVIRONMENTAL COORDINATOR: Belle Smith

**Summary**

This document is an Environmental Assessment (EA) and Finding of No Significant Impact (FONSI) for the proposed Klickitat Tie LSR Enhancement Project, tract number 02-303. The project area is located in T.13 S., R. 7 W., Sections 9, 15, and 21, Willamette Meridian, Benton County. The land use allocations are Late Successional Reserve (LSR) and Riparian Reserve.

**Alternative 1**, the proposed action, would remove approximately 4,640 thousand board feet (4,640 MBF) from approximately 290 acres of land in accordance with the *Salem District Resource Management Plan* and the *Northwest Forest Plan*. The sale would involve density management in young conifer dominated stands 47 to 60 years old, along with coarse woody debris (CWD) enhancement, instream log placement, riparian conifer release, and road building followed by decommissioning. Approximately 172 acres of the treatment area would be aerial yarded, while the remaining harvest area would be skyline yarded ( 112 acres) and yarded using a ground based system (6 acres).

**Alternative 2** would be the same as Alternative 1 except that approximately 236 acres would be treated, and approximately 54 acres would be deferred, decreasing the acreage in Units 6 and 7 and 8. This would result in 118 acres of aerial yarding, 112 acres of skyline yarding and 6 acres of ground based yarding.

**Alternative 3** would be the same as Alternative 1, except felled trees would not be removed from the project area.

**Alternative 4** is the “No Action” alternative in which all of the proposed treatments would be deferred.

The environmental analysis focuses on the following issues identified through scoping and by an interdisciplinary team of BLM resource specialists:

Vegetation/Botany: Effects on special attention species and habitats. Effects on spread of noxious weeds. Effects on long-term forest health and stand biodiversity.

Soils: Effects on long-term site productivity. Effects on surface disturbance and erosion.

Fuels: Effects on fuel loading, fire risk and air quality.

Water/Riparian: Effects on stream flow, channel conditions, and water quality. Effects on long term instream large wood recruitment. Effects on attainment of Aquatic Conservation Strategy (ACS) objectives.

Wildlife: Effects on terrestrial habitats within the project area and across the watershed. Effects wildlife species which BLM , by law and policy, is required to protect, maintain, or recover.

Fisheries: Effects on fisheries and their habitats.

Visual Resources: Effects on Visual Resource Management (VRM) Class II and III visual resources.

For further information, contact Amy Haynes (503-315-5955), 1717 Fabry Rd. S.E., Salem, Oregon, 97306. Comments on this environmental assessment are due January 18, 2002.

# FINDING OF NO SIGNIFICANT IMPACT

## Introduction

The Bureau of Land Management (BLM), Marys Peak Resource Area has analyzed the potential effects of a density management, coarse woody debris enhancement, instream log placement, riparian conifer release and road management project in the upper drainage (T 13 S, R 7 W, Sections 9, 15 and 21) of the Upper Alsea River Watershed, Benton County, Oregon. The action described in this environmental assessment (EA) is a density management harvest to enhance wildlife habitat within Late Successional Reserves and Riparian Reserves. The action would meet the needs for forest habitat as identified in the *Salem District Record of Decision and Resource Management Plan* (RMP, May 1995; see pp. 1 and 2). The EA is attached to and incorporated by reference in this FONSI determination.

This FONSI and the EA are being made available for public review prior to making a decision on the action. The public notice of availability for review will be published in the *Corvallis Gazette-Times* and through notification of interested individuals, organizations, and state and federal agencies. They will also be available for review on the internet at this address: <http://www.or.blm/salem> (under Planning).

## Finding Rationale

Under the alternatives analyzed, significant impacts on the quality of the human environment would not occur based on the following criteria:

1. The alternatives are in conformance with the following documents which provide the legal framework for management of BLM lands in the Marys Peak Resource Area:

- *Record of Decision and Standards and Guidelines for Amendment to the Survey & Manage, Protection Buffer, and other Mitigation Measures Standards and Guidelines* (January 2001) and the *Final Supplemental Environmental Impact Statement For Amendment to the Survey & Manage, Protection Buffer, and other Mitigation Measures Standards and Guidelines* (S&M FSEIS, November 2000).

- *Salem District Record of Decision and Resource Management Plan* (RMP, May 1995).

- *Salem District Proposed Resource Management Plan/Final Environmental Impact Statement* (FEIS, September 1994).

- *Record of Decision for Amendments to Forest Service and Bureau of Land Management Planning Documents Within the Range of the Northern Spotted Owl* (April 1994) and the *Final Supplemental Environmental Impact Statement on Management of Habitat for Late-Successional and Old-Growth Forest Related Species Within the Range of the Northern Spotted Owl* (SEIS, February 1994).

2. The action would be consistent with the Aquatic Conservation Strategy Objectives and

promote development of older forest characteristics in the riparian reserves (See Appendix A, Aquatic Conservation Strategy Objectives Review Summary). The following table shows how this action relates to required components of the Aquatic Conservation Strategy (*RMP*, pp. 5-7):

**RELATIONSHIP OF ALTERNATIVES TO RELEVANT MANAGEMENT DIRECTION**

Component	Relationship to this Action
Interim Riparian Reserves	Alt. 1 (Proposed Action): Density management harvest would occur inside Riparian Reserves. Management actions/direction for Riparian Reserve include application of silvicultural practices to control stocking, re-establish and manage stands, and acquire desired vegetation characteristics needed to attain Aquatic Conservation Strategy objectives. ( <i>RMP</i> p.11),
Key Watersheds	The proposed project area is not in a Key Watershed.
Watershed Analysis	The <i>North Fork Alsea Watershed Analysis</i> (part of the Upper Alsea River Watershed) was completed in July 1996. This proposed action was specifically designed to respond to several resource issues identified in this watershed analysis. Many of the recommendations identified in the analysis have been incorporated into this proposed action including: density management within LSR and Riparian Reserves, road decommissioning, and coarse woody debris enhancement for wildlife habitat and future large wood recruitment into stream channels.

Watershed Restoration	Recommendations from the watershed analysis that promote watershed restoration provide part of the purpose and need for this proposed action. These include road decommissioning to improve long term hydrologic recovery, instream log placement and conifer release to improve current and future fisheries habitat. Effects to resources described in the Aquatic Conservation Strategy objectives (stream physical integrity, water quality, sediment regime, in-stream flows, species composition, etc.) are addressed in the Environmental Consequences section of this EA.
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3. The proposed action and alternatives are in conformance with the *RMP*, which describes the general management objectives, land use allocations, and management actions/ direction for BLM-administered lands in the Marys Peak Resource Area

4. The alternatives are consistent with other federal agency and State of Oregon land use plans and with the Benton County land use plan and zoning ordinances. Any permits associated with the implementation of this project would be obtained and requirements would be met.

5. There are no flood plains, or prime or unique farmlands within the sale area.

6. No known cultural resources or paleontological resources occur in the project area. A post-harvest survey would be done upon completion of the project according to *Protocol For Managing Cultural Resources on Lands Administered by the BLM in Oregon, Appendix D* dated August 5, 1998.

7. The proposed project would not affect suitable habitat for the northern spotted owl or marbled murrelet. However, it was determined that this proposed action “may affect” both of these listed species. To address this concern, consultation was completed with the U.S. Fish and Wildlife Service, under the *Programmatic Biological Assessment of Fiscal Year 2001 Projects in the North Coast Province which would modify the habitats of Bald Eagles, Northern Spotted Owls, or Marbled Murrelets* (August 11, 1999). A final Biological Opinion was received on October 4, 2000, which concluded that the entirety of the planned actions for the fiscal year were not likely to result in jeopardy to these listed species. This Biological Opinion will remain in effect for fiscal year 2002 timber sales. All applicable terms and conditions from the Biological Opinion have been incorporated into the project design features for this proposed action.

8. The Level 1 Team which assesses potential impacts to listed fish determined that the proposed project is a “May Affect, Not Likely to Adversely Affect” Oregon coast coho salmon. The Biological Assessment was submitted to the National Marine Fisheries Service (NMFS) during

August of 2001. The Letter of Concurrence, responding to that BA has not yet been issued. However, with the recent de-listing of Oregon coast coho as a result of a court order by Judge Hogan, an ESA determination is no longer applicable. If the ruling is appealed by NMFS and the ruling overturned, then the effect determination would be as described and still be awaiting concurrence from NMFS.

9. The proposed action is within the coastal zone as defined by the Oregon Coastal Management Program. This proposal is consistent with the objectives of the program, and the state planning goals which form the foundation for compliance with the requirements of the Coastal Zone Act. Management actions/direction found in the RMP were determined to be consistent with the Oregon Coastal Management Program.

10. No hazardous materials or solid waste would be created in the sale area.

11. The sale area does not qualify for potential wilderness nor has it been nominated for an Area of Critical Environmental Concern.

12. Project design features would assure that potential impacts to water quality would be in compliance with the State of Oregon In-stream Water Quality Standards and thus the Clean Water Act.

13. The smoke generated from burning piles would be within the standards set by the Oregon Smoke Management Plan, which considers national air pollution standards and complies with the Clean Air Act.

14. In accordance with the *RMP* (see pp. 21-22), the amount of late successional forest (i.e., 80 years and older) on federal lands was determined for the Marys River Watershed and the Upper Alsea Watershed. The 80+ forest age classes occur on approximately 37 percent of the federal lands in the Marys River Watershed and on approximately 37 percent of the federal lands in the Upper Alsea Watershed. This exceeds the *RMP* standard of 15 percent. No late-successional forest stands would be affected by this action.

The actions are local in nature; potential adverse impacts would be short-term. Impacts were determined based on research, observation, professional training, and experiences by the interdisciplinary team of natural resource specialists. Determining such environmental effects reduces the uncertainties to a level that does not involve highly unknown or unique risks. The design features identified in the EA would assure that no significant site-specific nor cumulative impacts would occur to the human environment other than those already addressed in the *S&M FSEIS*, *FEIS* and *SEIS*.

## **Finding of No Significant Impact Determination**

Based on the analysis of information in the attached EA, my determination is that a new environmental impact statement or supplement to the existing FEIS is unnecessary and will not be prepared. The proposed action would not result in significant environmental impacts affecting the quality of the human environment greater than those addressed in the existing FEIS.

Cindy Enstrom  
Marys Peak Field Manager

12-17-01  
D a t e

Comments regarding this environmental assessment should be received by the Bureau of Land Management, Marys Peak Resource Area, by January 22, 2002 .

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# ENVIRONMENTAL ASSESSMENT

## I. PURPOSE AND NEED

### A. Background

The proposed project is located in the Upper Alsea River fifth field watershed. The northern portion of this watershed was analyzed in the *North Fork Alsea Watershed Analysis*, (NFAWA, July 1996), and the *North Fork Alsea and South Fork Alsea watershed Analyses Riparian Reserve Treatment Recommendations Update*, (RRTU, May 2000). The first document outlined management recommendations for restoring and enhancing ecosystem conditions. The second document recommended density management after site specific analysis on stands exhibiting characteristics similar to those in the proposed project area (p. 5-6 and Table 2, p.7) The NFAWA also identified a corridor of federal lands that could provide a significant opportunity to promote terrestrial connectivity of older forest habitats across the watershed.

In June of 1997 an interagency team of specialists from the Forest Service, BLM, and USFWS completed the *Late Successional Reserve Assessment, Oregon Coast Province - Southern Portion* (RO267, RO 268), LSRA (June 1997). This document set priorities for treatment of federal lands designated as Late-Successional Reserves (LSR) across the landscape.

As a follow up to the findings of the LSRA and NFAWA, the Marys Peak Resource Area silviculture and wildlife staff began prioritizing areas within the LSR (unit RO268) that would benefit from density management and which would contribute to the provincial strategies for recovering LSR conditions across the landscape. Stand exams were completed that focused on managed stands within the NFAWA corridor. Over 3600 acres of forest stand data have been accumulated to date, with four density management projects planned and one implemented. The proposed project is intended to implement a subset of specific management opportunities that were identified within the NFAWA and LSRA in a manner consistent with standards and guidelines outlined in existing planning documents described below.

### B. Tiering

This environmental assessment (EA) is in conformance with the *Record of Decision and Standards and Guidelines for Amendment to the Survey & Manage Protection Buffer, and other Mitigation Measures Standards and Guidelines* (S&M ROD, January 2001) and the *Final Supplemental Environmental Impact Statement For Amendment to the Survey & Manage, Protection Buffer, and other Mitigation Standards and Guidelines* (S&M FSEIS, November 2000).

This (EA) is also tiered to the *Salem District Record of Decision and Resource Management Plan* (RMP, May 1995) and the *Salem District Proposed Resource Management Plan/Final*

*Environmental Impact Statement (FEIS, September 1994).* The *FEIS* analyzed broad scope issues and impacts within the President's direction to meet the need for forest habitat and forest products (p. 1). The *RMP* provides a comprehensive ecosystem management strategy for BLM-managed lands in the Salem District in strict conformance with the *Record of Decision for Amendments to Forest Service and Bureau of Land Management Planning Documents Within the Range of the Northern Spotted Owl (ROD, April 1994)*. All alternatives presented within this EA describe various forest management, road construction, and road decommissioning activities that are in compliance with the *RMP* and *ROD*.

This EA is also tiered to the *Western Oregon Program-management of Competing Vegetation Final Environmental Impact Statement, VMFEIS* (February 1989) and the *Western Oregon Program-Management of Competing Vegetation Record of Decision* (August 1992). The VMFEIS analyzed broad scope issues and impacts for an integrated vegetation management strategy consisting of various treatments and the decision document identifies treatments and provides processes to meet vegetation management objectives (p. 3) and resource management goals (p.33).

This EA is also tiered to the *Northwest Area Noxious Weed Control Program Final EIS* (USDI, 1985) and the associated *Record of Decision* (USDI, April 7, 1986), and the *Supplement to the Northwest Area Noxious Weed Control Program* (USDI, March 1987) and the its associated *Record of Decision* (May 5, 1987). This EA will analyze vegetation management treatments such as site preparation and reforestation in the proposed project area.

The EA is a site-specific analysis of the proposed action and alternatives prepared under general management guidance provided in the *RMP*. The *RMP* is available for review in the Salem District Office. A general description of the project area may be found in this EA under Description of Affected Environment/Environmental Consequences. Additional information about the proposed project is available in the Klickitat Tie Project EA file.

## **C. Management Objectives**

The following general objectives guided the development of alternatives for this proposed project:

### Late-Successional Reserves (*RMP*, pp.15-18)

Late-Successional Reserves are to be managed to protect and enhance conditions of late-successional and old-growth forest ecosystems. These lands are to serve as habitat for late-successional and old-growth related species including the northern spotted owl (*RMP*, p.15). Most of the federal lands designated as Late-Successional Reserves within the northern Oregon Coast Range consist of forest stands less than 80 years of age, and thus are not considered late-successional forest. Silvicultural treatments in managed stands less than 80 years of age offer the opportunity to reduce overstocked density, alter tree species diversity, alter forest structural

characteristics, and amend coarse woody debris conditions. Such treatments are believed to result in forest stands that more closely approximate the structure and function of a late-successional forest. As these treated stands age beyond 80 years, secondary structural characteristics (e.g. understory canopy development, large dominant trees) are likely to develop sooner than if no treatments were performed. Analysis of stand projection models for forest stands in the proposed treatment area show that attainment of large tree diameters (greater than 24 inches) can be attained sooner, by as much as 45 years if treatments are performed. Thus, for a majority of forest stands within LSRs of the Oregon Coast Range, silvicultural treatments such as density management and coarse woody debris enhancement are viewed as a means to enhance late-successional forest conditions and accelerate attainment of these conditions across the landscape.

The *LSRA* provides guidance for determining which forest stand conditions would warrant silvicultural treatment and what types of treatments would be appropriate to achieve desired forest stand conditions. The proposed action and all alternatives described in this EA have been designed to be consistent with the guidance outlined in the *LSRA*

#### Riparian Reserves (*RMP*, pp. 6-7, 9-15)

Riparian Reserves are a basic component of the Aquatic Conservation Strategy (ACS) designed to work together with Key Watersheds, Watershed Analysis, and Watershed Restoration to maintain and restore the productivity and resilience of riparian and aquatic ecosystems (*RMP* p.6). Riparian Reserves are the portions of the watershed required for maintaining hydrologic, geomorphic, and ecological processes that directly affect streams, stream processes, and fish habitats. They are also designed to provide travel corridors and resources for both riparian dependant and other riparian and/or late-successional associated plants and animals. Management objectives as stated in the *RMP* are to provide habitat for special status, SEIS special attention and other terrestrial species and to meet ACS objectives.

These long-term objectives may be achieved by utilizing silvicultural practices within Riparian Reserves designed to provide specific desired vegetation characteristics needed to attain Aquatic Conservation Strategy objectives (*RMP*, p.11). In addition, the *LSRA* recognizes the need for density treatments to meet long term objectives both outside and inside Riparian Reserves (p.40).

#### Watershed Objectives

The proposed project is located in the Upper Alsea River fifth field watershed. The northern portion of this watershed was analyzed in the *NFAWA*, and the *RRTU*. The first document outlined management recommendations for restoring and enhancing ecosystem conditions. Among these were density management treatment in LSR and Riparian Reserves (p. 121, 134, Map 15 on p. 157), coarse woody debris enhancement (p. 134, 138), instream log placement (p. 129), riparian conifer release (p. 134) and road restoration (p. 123, 132, 135, 136, 139). Existing road 13-7-21.1B,C in Unit 9 was specifically recommended to be decommissioned (Appendix 6,

p. 207). The second document recommended density management after site specific analysis on stands exhibiting characteristics similar to those in the proposed project area (p. 5-6 and Table2, p.7)

#### Aquatic Conservation Strategy objectives (*RMP*, pp.5-6)

The Aquatic Conservation Strategy as described in the *ROD* (pp. B-9 to B32) outlines several objectives for maintaining and restoring the function of aquatic ecosystems including riparian areas, wetlands, and flood plains. Establishment of Riparian Reserves (*RMP* p. 9-15) and completion of watershed analysis are key components of the Aquatic Conservation Strategy, designed to maintain and restore these unique ecosystems. The *LSRA* addresses the restoration and enhancement of forest stand conditions in LSRs including stands within Riparian Reserves. The *NFAWA* identified roads within this watershed that could be closed and/or decommissioned to recover hydrologic function and reduce sediment delivery to aquatic systems. The proposed action and all alternatives described in this EA have been designed to be consistent with the guidance outlined in both the *LSRA* and the *NFAWA* and are intended to contribute to watershed restoration objectives of the ACS. See Appendix A, Aquatic Conservation Strategy Objectives Review Summary.

#### Wildlife/Fish Habitat (*RMP*, pp.24-28)

Projects should be designed to improve conditions for wildlife and fish in LSRs, and should meet Aquatic Conservation Strategy objectives in Riparian Reserves.

#### Water and Soil Resources (*RMP*, pp.22-24)

BLM is directed to comply with State of Oregon water quality requirements to restore and maintain water quality and to protect recognized beneficial uses in watersheds, and to improve and/or maintain soil productivity.

#### Air Quality (*RMP*, p.22)

BLM is directed to meet “National Ambient Air Quality Standards, Prevention of Significant Deterioration” goals, and the Visibility Protection Plan. In addition, projects must be consistent with the Clean Air Act and State implementation plan. Prescribed fire and other fuels management techniques should be used to reduce the potential for wildfire emissions.

#### Visual Resources (*RMP*, p. 36)

Retain the existing characteristics (VRM Class II) of the portions of units 1, 2, 3 and 7 which face Highway 34. Partially retain the characteristics of the rest of unit 1 and the west facing portion of unit 2.

### Special Status and SEIS Special Attention Species (RMP, pp. 29-31)

Protect, manage and/or conserve habitat for these species so as not elevate their status to any higher level of concern.

## **D. Scoping**

Efforts to involve the public in planning for the proposed action were as follows:

- ! The general area was allocated Late-Successional Reserves in the *RMP* and the *ROD*. These documents were widely circulated in the state of Oregon and elsewhere, and public review and comment were requested at each step of the planning process.
- ! A letter was mailed to interested parties on June 8, 2000 outlining the proposed action and requesting initial public input.
- ! A description of the proposal was included in the Salem Bureau of Land Management *Project Update* and mailed in July and September 2001 to more than 1200 individuals and organizations on the mailing list.
- ! A legal notice announcing availability of the EA for public review and comment will be submitted to the *Corvallis Gazette-Times*.
- ! Copies of the EA are being mailed to individuals, interest groups and agencies who responded to initial public input.
- ! The EA and FONSI are available for review on the internet at Salem BLM's website, <http://www.or.blm/salem> (under Planning)

## **II. ALTERNATIVES, INCLUDING THE PROPOSED ACTION**

### **A. INTRODUCTION**

This section describes alternatives identified by the interdisciplinary (ID) team that helped develop the proposed project. Forest management treatments incorporated in the proposed action conform with standard practices and design features intended to reduce the environmental effects of timber harvest and related activities. They comply with Best Management Practices (*RMP*, Appendix C) and the Standards and Guidelines specified in Appendix A of the *ROD*.

### **Scoping Issues**

The following issues concerning the proposed action were identified through public scoping and

by and ID team of BLM natural resource specialists representing various fields of science (see Section VI, Interdisciplinary Team Members). Issues that were considered but eliminated from further analysis are documented in Appendix F, Environmental Elements Review Summary.

Vegetation/Botany: Effects on special attention species and habitats. Effects on spread of noxious weeds. Effects on long-term forest health and stand biodiversity.

Soils: Effects on long-term site productivity. Effects on surface disturbance and erosion.

Fuels: Effects on fuel loading, fire risk and air quality.

Water/Riparian: Effects on stream flow, channel conditions, and water quality. Effects on long term instream large wood recruitment. Effects on attainment of Aquatic Conservation Strategy (ACS) objectives.

Wildlife: Effects on terrestrial habitats within the project area and across the watershed. Effects wildlife species which BLM, by law and policy, is required to protect, maintain, or recover.

Fisheries: Effects on fisheries and their habitats.

Visual Resources: Effects on Visual Resource Management (VRM) Class II and III visual resources.

## **B. SUMMARY OF ALTERNATIVES**

### **1. ALTERNATIVE 1: PROPOSED ACTION**

The intent of the proposed action is to enhance late-successional forest characteristics in relatively uniform dense conifer stands by density management and coarse woody debris creation, road decommissioning to improve long term hydrologic recovery, and instream log placement and conifer release to improve current and future fisheries habitat. The proposed project area is located in Sections 9, 15 and 21 of T. 13 S., R. 7 W., in the Upper Alsea River watershed and would incorporate the following activities:

- Employ a density management treatment and a combination of skyline, ground-based, and aerial yarding to harvest approximately 4,640 thousand board feet (MBF) of timber in 9 units, totaling approximately 290 acres. Density management treatments would differ slightly within 200 feet of all streams to accommodate the large woody debris recruitment needs of streams.
- Road construction and decommissioning which would result in a net reduction of road miles as displayed below in Table 2. Four helicopter landings would be constructed adjacent to roads or within existing open areas to facilitate helicopter yarding and servicing. Three of these landings would be located on private land. Most of the operations associated with hauling would be seasonally restricted to the period of May 1 to October 31. Further details on seasonal restrictions are addressed in Design Features for Soils.

- Coarse woody debris (CWD) enhancement would be achieved by a combination of harvest activities (breakage, limbs and tops, trees felled but not harvested), and post-harvest CWD creation.
- A small number of logs would be placed in Cabin Creek between Units 2 and 3 during the aerial yarding operation. Elsewhere in the project area, approximately 4 trees per acre (approximately 4 trees per 900 feet of stream) would be cut and left in or adjacent to streams after the sale is completed.
- Conifers would be released by cutting hardwoods in three areas. Two upland sites would be part of the sale and hardwoods would be removed. The third site within the Cabin Creek Riparian Reserve would be treated after the sale and the cut hardwoods would remain.

## PROJECT DESIGN FEATURES

Project design features are specific constraints placed on the design and implementation of this project for the purposes of mitigating potential impacts to natural resources. The design features of this proposal are described below. All acres and other numerical units are approximate.

### I. Vegetation/Density Management.

- Management of Survey and Manage Species found as a result of inventories would be accomplished in accordance with the *Record of Decision and Standards and Guidelines for Amendment to the Survey & Manage, Protection Buffer, and other Mitigation Measures Standards and Guidelines (S&M ROD, January 2001)* and the *Final Supplemental Environmental Impact Statement For Amendment to the Survey & Manage, Protection Buffer, and other Mitigation Measures Standards and Guidelines (S&M FSEIS, November 2000)*.
- Management of all survey and manage known sites located within the proposed project area would be accomplished in accordance with management direction listed on pages 8 through 14 of the standards and guidelines S&M ROD, January 2001. All of the known sites would be withdrawn from any timber harvesting activity which would minimize any soil disturbance and protect the known site micro-climate.
- All known sites of any special attention vascular plant, lichen, bryophyte and fungi species within the proposed project area previously listed in the Northwest Forest Plan which are included in Table 1-2, *Species Removed from Survey and Manage, Protection Buffers and Protect From Grazing in all of Part of Their Range*, page 53, S&M ROD, would not receive any special protection from this thinning operation.
- Approximately 290 acres of dense conifer stands would be treated in 9 separate units.

Density management would be accomplished by selectively cutting all Douglas-fir and western hemlock with diameters that fall within limits described for each unit in Table 1. Prescriptions for stream influence zones (SIZ) which occur within approximately 200 feet of streams, differ slightly in most units from those for upland portions of the proposed sale area. Upland, for this table is defined as those areas both within and outside of Riparian Reserves which fall outside of SIZ. (See Riparian Affected Environment, Section III D).

**Table 1.** Summary of Density Management Treatments for Alternative 1

Unit #	Total Unit Acres <sup>1</sup>	Upland Acres <sup>1</sup>	Prescription Diameter Limit <sup>2</sup>	Stream Influence Zone (SIZ) Acres <sup>1</sup>	Prescription Diameter Limit <sup>2</sup>
1	9	8	7.0 - 16.0	1	7.0 - 14.0
2	11	9	7.0 - 17.0	2	7.0 - 15.0
3 <sup>3</sup>	8	8	7.0 - 17.0	0	-----
4	49	36	7.0 - 19.0	13	7.0 - 18.0
5	18	13	7.0 - 19.0	5	7.0 - 18.0
6	61	39	7.0 - 14.0	22	7.0 - 14.0
7	24	16	7.0 - 16.0	8	7.0 - 14.0
8	37	26	7.0 - 14.0	11	7.0 - 14.0
9	73	56	7.0 - 16.0	17	7.0 - 15.0
	290	211		79	

1. The size of each treatment unit and total treatment area has been estimated, and may vary by less than  $\pm 5\%$ .
2. All Douglas-fir and western hemlock with a dbh within the designated diameter limit would be cut. Diameter limit is shown in inches.
3. No part of Unit 3 is within 200 feet of a stream.

- All snags, and some trees with desirable wildlife characteristics such as broken tops, forks, deformities, etc. would be reserved to enhance structural diversity. All conifer and hardwood species other than Douglas-fir and western hemlock would be reserved to enhance species diversity, except in rights-of-way, yarding corridors and for safety considerations.
- Some target conifers within the diameter limit would be reserved from felling to retain their unique structure and/or benefit to wildlife. Also, some target conifers having a DBH above the diameter limit but less than 20 inches would be designated for felling to achieve desired stand density and to provide release of adjacent dominant individual

conifers. Trees designated for reserve are expected to balance trees designated for felling, such that the desired residual stand density (from Table 1) is achieved on a per treatment unit basis.

- Conifers growing under the shade of hardwoods in two upland areas in Units 1 and 6 (See Map 1) would be released, using the same design features as those in Cabin Creek (see Water/Fish/ Riparian design features) with the following exception:
  - All cut hardwoods would be removed from the sale area by the purchaser.
- All minor conifer species (e.g.; western red cedar, pacific yew) and all hardwood species (except those in the designated conifer release areas) would be reserved, unless felling these trees is needed for operability or safety considerations.
- “No-treatment” areas totaling more than 10 percent of the total project area would be incorporated into the proposed project. These areas are designated as red tree vole exclusions, fungi management areas and stream protection zones and would be reserved from treatment.
- Up to 10 percent of the treatment area would be thinned to a wider spacing or have openings that are 0.25 to 1.0 acre in size.
- Understory conifers less than 7.0 inches would be retained where possible.
- Openings created by density management would be planted with shade tolerant conifers such as western hemlock and western red cedar as determined by the Resource Area silviculturist.

## **II. Wildlife**

- Harvest operations and associated activities would be conducted in conformance with the applicable Biological Opinion (# 1-7-00-F-649) concerning listed wildlife species. Pertinent Terms and Conditions for this BO include:
  - ▶ Notify the Resource Area Biologist if any federally listed wildlife species are found occupying stands proposed for treatment.
  - ▶ Seasonal restrictions for operations might be necessary if a listed species is found occupying forest stands within 0.25 miles of the proposed units (current survey efforts have found no listed species in this area).
- Active red tree vole sites would be protected by excluding nest sites from proposed unit boundaries and managing sites in accordance with current management recommendations

(at least 10 acres per site).

- Management of coarse woody debris (CWD) would occur within a treatment boundary that includes all of the proposed density management units and extends beyond these proposed units to include areas of similar stand age and structural characteristics as have been targeted for treatment. (See Map 1)
- Within proposed density management unit boundaries CWD would be managed by:
  - ▶ retaining existing down logs and snags except where they pose a safety risk, or affect access and operability. Any trees felled or moved for these purposes would remain on site within the project area;
  - ▶ leaving all trees 20 inches DBH and larger incidentally felled for rights-of-way, yarding corridors or tailholds. Additional trees smaller than 20 inches DBH incidentally felled for these purposes would be left where necessary to total 3 trees per acre.
  - ▶ within 3 to 5 years after completion of harvest activities, monitoring of harvest and natural mortality recruitment would determine if 1-3 trees per acre (see Table 8, Wildlife Affected Environment) are functioning as hard snags/logs (Class 1 or 2) within treatment units;
  - ▶ If monitoring determines there are less than the target level of hard snags/logs per acre, then additional trees having a greater than average stand diameter (post-treatment) would be girdled, topped, or felled to achieve the target;
- Outside of proposed density management unit boundaries CWD would be managed by:
  - ▶ trees would be selected for girdling, felling, or topping within defined boundaries that are adjacent to proposed harvest units (see Map 1);
  - ▶ up to 5 large trees per acre (trees having greater than average stand diameter, pre-treatment), and up to 20 small trees per acre (trees having less than average stand diameter, suppressed trees) would be selected for CWD treatment;
  - ▶ selected trees would be scattered individuals or occur in patches up to 1/10th acre in size, with no more than 1 such patch occurring per 2 acres of treatment area (5 percent in open patches), and while maintaining a canopy closure greater than 60 percent over the entire treatment area;

- ▶ no CWD treatments would occur in S&M species reserves (fungi, red tree voles) and no trees having existing stick nests would be selected;
- ▶ such treatments would be contingent on available funding and would be accomplished within 3 to 5 years after completion of harvest activities, and likely concurrent with CWD monitoring/treatments of proposed harvest units as described above.

### **III. Yarding**

Ground based yarding (approximately 6 acres in Units 1, 2 and 4)

- Yarding with ground-based equipment would be allowed on slopes less than 35 percent.
- Timber would be left standing until as close to the time of yarding as possible.
- Slash and logging debris would be maintained on skid roads during and after yarding to reduce soil disturbance and compaction.
- If crawler tractor equipment is used, equipment would be required to operate on top of slash as much as practical and utilize pre-designated “skid roads” spaced at least 150 feet apart.

If a shovel is used, machines should be kept on areas with heavy slash accumulations and yarding corridors should be spaced 50 ft apart.

- Yarding would only be allowed during periods of low soil moisture, generally between August 1 and October 15. Yarding would be shut down during this period if necessary to avoid excessive soil and water resource impacts. See Appendix B, Summary of Seasonal Restrictions

Skyline Yarding (approximately 112 acres, in Units 1, 2, 4, 5, 6, 7 and 9)

- Yarding corridors should be spaced a minimum of 150 ft apart.
- Partial suspension is required, except as noted below.
- Full suspension is required within the stream protection zone on the stream in the NW corner of Unit 9.
- Yarding is allowed all year, but may be temporarily stopped due to bark slippage (generally between April 15 and June 15), as determined by the Authorized Officer.

Aerial Yarding (approximately 172 acres, in Units 3, 4, 5, 6, 7, 8 and 9)

- The four rocked helicopter landings would be the minimum size necessary to complete the job safely. Helicopter landing in section 9 would require some trees to be cut. Any cut trees over 20" would be managed in accordance with the CWD prescription (see Wildlife Design Features).
- Yarding is allowed all year, subject to soil conditions as determined by the Authorized Officer.

#### **IV. Road and Landing Construction, Road Management**

- All landings would be constructed to minimal dimensions. Helicopter landings on private land would be constructed to meet requirements of the landowner.
- Road construction would be allowed only during periods of low soil moisture, generally between May 1 and October 31. Road construction would be shut down if necessary during this period to avoid excessive soil and water resource impacts.
- Approximately 2600 feet of new road, located predominantly on or near ridgetops, would be constructed, as displayed in Table 2. All of these roads would be decommissioned at the end of the proposed sale.
- Approximately 1100 feet of proposed new construction would be surfaced in order to extend the season of logging and hauling (Roads P-1 and P-8). The rest of the proposed new construction would remain natural surface unless the purchaser chooses to rock them.
- Approximately 3600 feet of well vegetated existing road in Unit 9 would be decommissioned in conjunction with the sale. This would result in a net decrease of 3600 feet of road within the North Fork Alsea watershed.
- Approximately 300 feet of Rd 13-7-9 would be reconstructed in Unit 6. This work would include brushing, blading, and minimal excavation. It would be rocked and remain a permanent road.
- An estimated 20,000 feet of existing road could receive additional surface aggregate at locations where insufficient rock depth exists.
- Timber hauling would be permitted only during periods of dry weather and low soil moisture, generally between May 1 and October 31, except as noted below.
- Timber hauling would be permitted all year on the following roads:

- Road 13-7-10 from the helicopter landing in section 10 to Highway 34.
- From Roads P-6 and P-7 to Highway 34, along Roads 13-7-16.4, 13-7-21.5 and 13-7-22.1, if the purchaser chooses to rock P-6 and P-7. There are no stream crossings along this route.
- All hauling would be shut down at any time of the year if necessary to avoid excessive soil and water resource impacts.
- Improvements to existing roads would occur prior to hauling and would be ongoing as needed during hauling. They could include any of the following:
  - Increasing aggregate surface depth where necessary to support haul and reduce sediment discharge into area streams.
  - Adding sediment traps to ditches above culverts.
  - Construction of drain dips on lesser used roads.
  - Avoiding vegetation disturbance within ditches along BLM controlled roads during the life of the sale.
- The clearing limits associated with road construction would be as narrow as practicable to minimize disturbance to soils and vegetation.

**Table 2.** Summary of Road Construction and Use for Alternatives 1 and 2

Road Number	Length (feet)	Road Action	Road Type	Final Status	Remarks
P-1	770	N	S-P	D	Unit 2, rocked, ridgetop
13-7-9	300	RE	Perm	open, gated	Unit 6, rocked
P-6	540	N	S-P	D, gated	Unit 9, may be rocked if purchaser chooses
P-7	988	N	S-P	D, gated	Unit 9, may be rocked if purchaser chooses.
P-8 (13-7-22.1D)	305	N	S-P	D, gated	Unit 9, rocked
13-7-21.1B,C	3600	D	Perm	D, gated	Unit 9

13-7-10	10,300	R	Perm	open	Main haul route, existing agreements preclude closure
13-7-9	7400	R	Perm	gated	Main haul route, existing agreements preclude closure
13-7-9.1	3100	R	Perm	open	Existing WII road on BLM, rocked
13-7-22.1A & B	5900	R	Perm	gated	Existing WII road, rocked
13-7-21.4	4000	R	Perm	gated	Existing WII road, rocked
<b>Road Action:</b> N= new construction, R= renovation, D=decommission, RE=reconstruction <b>Road Type:</b> S-P= semi-permanent (temporary road, used more than 1 season), Perm= permanent surface <b>Final Status:</b> D= decommissioned.					

## V. Soils

- Soils management design features are listed under the Yarding and Roads sections.
- Areas of exposed soil within all new road construction and on ground-based yarding roads and landing locations would be seeded with Oregon certified (blue tagged) red fescue (*festuca rubra*) at a rate equal to 40 pounds per acre. The extent of soil disturbance would be determined in cable yarding corridors at the completion of yarding. If warranted for the abatement of any noxious weed infestations, these areas would be seeded.

## VI. Fuels/ Air Quality

- Debris cleared during road construction would be scattered along the length of the rights-of-way. Large accumulations and piles of debris that may later pose higher than necessary fire hazards would be avoided. No debris would be piled against trees or snags.
- Motor vehicle access near harvest areas during the fire season in the first year following harvest activities while fuels are in the “red needle” stage would be restricted if fire season weather and fuel conditions warrant. This would be done in collaboration with ODF and if needed, the roads would be posted with signs restricting entry.
- Debris accumulations on landings and along roads would be machine piled, covered with plastic and burned under favorable smoke dispersal conditions in the fall, in compliance with the State smoke management plan..
- No burning would take place within the Riparian Reserves.

## VII. Water/Fish/ Riparian

- All streams within or immediately adjacent to the proposed treatment areas would be

identified and marked. Fish presence within these streams would be determined.

- Density management treatments would be applied inside of Riparian Reserves as appropriate for enhancing late-successional forest structure, while avoiding ground disturbance that could impact adjacent water courses. (See Density Management design features, Table 1)
- Within Riparian Reserves, stream influence zones (SIZ), generally within 200 feet of streams, would be identified and density management prescribed to enhance future instream large woody debris (LWD) recruitment.
- Stream protection zones (SPZ) would be established along all streams and identified wet areas within the project area. See Appendix C, Criteria for Stream Protection Zones
- To protect water quality, trees would be felled away from all stream protection zones. Where a cut tree does fall within a stream protection zone, the portion of the tree within the stream protection zone would remain in place.
- Approximately 4 conifers per acre (4 trees per 900 feet of stream) would be cut and left in or adjacent to all streams in the project area, immediately after the sale is completed. It is expected that these trees would come from inside or very close to the stream protection zones, and would be cut only where sufficient conifers occur along that portion of the stream. Conifers cut would be equal to or larger than the average stand diameter. Additional trees could be felled into streams in the project area at the same time that additional upland CWD is created (approximately 3 to 5 years after the sale). Numbers of logs placed in or near streams at that time would be determined by the Resource Area fisheries biologist and subject to guidelines established for the Siuslaw National Forest for minimizing bark beetle infestation (Appendix D, Guidelines To Reduce Bark Beetle Mortality). Both projects would be accomplished by BLM personnel or service contract, and completion would be subject to funding.
- During the aerial yarding phase of the project, 16 to 20 logs would be placed by helicopter in Cabin Creek between Units 2 and 3. The logs would be approximately as long as practicable and with diameters of stand average or larger. It is expected that the logs would come from Unit 3 or from yarding corridors in Unit 2. No trees over 20" DBH would be used. This project may be accomplished by the purchaser or by service contract and would be subject to funding and safety considerations.
- Conifers growing under the shade of hardwoods along Cabin Creek would be released, using the following design features:
  - Hardwoods would be cut around each conifer identified for release to allow approximately 60 percent of total potential light to reach each released tree crown.
  - Only those overtopped conifers which demonstrate a good chance for survival would

be released.

- All cut trees would remain in place.
- Cut areas resulting in openings larger than 0.25 acres would be planted with western red cedar and/or western hemlock.
- No hardwoods would be cut from streambanks or where their roots are stabilizing the streambanks.
- Conifers occurring within 20 feet of the stream would be released to 40 percent of full sunlight.

This project would be accomplished by BLM personnel after the sale is completed.

### **VIII. Special Forest Products.**

- Special forest product permits for floral greenery, such as Oregon grape, sword-fern, and salal, and transplants such as vine maple, would be available by permit before and after harvest operations as appropriate for LSR and Riparian Reserve designated lands in this portion of the Marys Peak Resource Area.
- If firewood is present on the landings after completion of the logging contract, permits may be made available to the public. Prescribed burning would be delayed one or more seasons in order to accommodate fire wood cutting.

### **D. ALTERNATIVE 2: REDUCED ACRES TREATED** (See Map 2)

The following project design is described for Alternative 2, only where it differs from Alternative 1.

This alternative would perform a density management treatment on approximately 236 acres (deferring approximately 54 acres in Units 6, 7 and 8) with an approximate 864,000 board foot reduction in volume. The remaining areas in these units would be aerial yarded (approximately 45 acres) and skyline yarded (Approximately 23 acres). All proposed helicopter landings would still be built.

### **E. ALTERNATIVE 3: NO YARDING**

The following project design is described for Alternative 3, only where it differs from Alternative 1.

This alternative would perform a density management treatment on approximately 290 acres ( the same area as Alternative 1), but no trees would be removed from the treatment areas.

### **F. ALTERNATIVE 4: NO ACTION**

All proposed treatments would be deferred.

## **G. ALTERNATIVES CONSIDERED BUT ELIMINATED**

- Additional forest stands in Section 9, 15, and 21 were considered for treatment but eliminated from further consideration after field review and discussion by the Interdisciplinary Team. Stands were eliminated for the following reasons:
  - ▶ Some stands lie on sensitive resource sites (e.g. steep slopes, riparian habitats, high water tables, Survey and Manage sites) where treatment would risk resource impacts beyond those anticipated by current plans and guidance.
  - ▶ Some stands already exhibit structural development such that treatments would not appreciably enhance their development toward late-successional forest conditions.
- An alternative to harvest the entire sale with aerial yarding was considered by the ID team, but eliminated from further analysis for the following reasons:
  - Soils and topography on portions of the proposed sale area are well suited for road construction, cable yarding, and a small amount of ground based yarding. Spur roads can be constructed on stable locations to provide access to suitable log landing sites. Excessive road building or road building in high hazard areas would not occur in the project area; therefore, aerial yarding in some portions of the sale area is unnecessary.
  - Aerial yarding is expensive compared to the cost of conventional yarding, and the cost could not be justified for the above reasons.

## **III. DESCRIPTION OF THE AFFECTED ENVIRONMENT and ENVIRONMENTAL CONSEQUENCES.**

### **A. Introduction**

This section describes the environmental features affected by the proposed action and the environmental consequences which would result from implementing this action or the alternatives. This information is summarized in Appendix E. Resource values are not described in this section if there are no anticipated site-specific impacts, site-specific impacts are considered negligible, or the cumulative impacts described in the *PRMP/FEIS* are considered adequate.

In accordance with statutes, regulations, and executive policies, some resource values and uses must be reviewed in all environmental assessments. A list of these resources and the results of the review for the project area are presented in Appendix F, Review Summaries .

## **B. Vegetation**

Issue: Effects on long-term forest health and stand biodiversity. Effects on native plant species. Effects on Special Status Species or SEIS Special Attention Plant Species. Effects on the significant increase of noxious weeds, and effects on occurrence of noxious weed species on the project area.

### **Vegetation: Affected Environment**

#### Structure/Species Composition

The stands in the proposed project area were logged in the 1940's and 1950's and most likely seeded in naturally after logging. They range in age from 47 to 55 years and all are generally uniform, densely stocked mixed Douglas-fir and western hemlock stands (see Tables 3A-3I). All stands still have relatively high crown ratios (37 percent and higher). While south and east slopes are generally dominated by Douglas-fir, north and west slopes are dominated by a mixed canopy of Douglas-fir and western hemlock. Vine maple is the dominant understory and is thick on many of the south facing slopes, particularly in areas where the canopy is less than approximately 80 percent. Red huckleberry, California hazelnut and ocean spray are also common understory species. The shrub/forb layer is dominated mainly by salal on the ridges, upper slopes and extends to lower slopes on the south and east facing slopes where it is replaced in abundance by sword-fern. Sword-fern is dominant on mid to lower slopes but is common on upper slopes on the north and west facing slopes. Oregon grape is common and often scattered in abundance within the salal dominated upper slopes and ridges.

In many areas there is neither an understory nor any vascular plant ground cover as the canopy closure is greater than 90 percent. The lack of sunlight, through the thick canopy, in many areas does not allow for enough energy for plants to survive in these shaded environments. In fact, several areas within the sale were previously dominated by vine maple, and since have been shaded out by the conifers, resulting in dead vine maple patches. Canopy closure averages 80 percent with little understory development. Conifer species other than Douglas-fir and western hemlock occur as minor species, and hardwoods occur scattered throughout the stands, but mostly occurring along streams. The western hemlock/salal and western hemlock/sword-fern/vine maple plant associations are the most common found in the project area.

The two areas proposed for conifer release in Units 2 and 6 have a dense overstory of red alder, with an understory primarily composed of western hemlock and Douglas-fir. These are upland areas where alder presumably seeded in after logging.

#### Survey and Manage (Botany)

Inventories of Survey and Manage vascular plants, fungi, lichen and bryophytes were accomplished in accordance with established protocols. Documentation of the inventories can be found in the

EA file. Protocols can be found at <http://www.or.blm.gov/surveyandmanage>.

*Vascular plants:*

Inventory of the project area for survey and manage vascular plant species was accomplished in accordance with the survey protocols as described on page 3 of *Survey Protocols for Survey and Manage Strategy 2 Vascular Plants*, version 2.0, December 1998.

A) Special Status Species

There are no “known sites” of any special status vascular plant species within the project area nor were any found during subsequent surveys.

B) Special Attention Species

There are no “known sites” of any special status vascular plant species within the project area, nor were any found during subsequent surveys.

*Lichens:*

Inventory of the project area for survey and manage lichens was accomplished in accordance with the survey protocols as described within the *Survey Protocols for Component 2 Lichens* version 2.0, March 12, 1998. Inventories for newly assigned lichen species into categories "A" and "C" of the *S & M ROD* that currently have no protocols were surveyed using the intuitive control method. However, pre-disturbance surveys for these species may not be required for up to two years as described on page 23 of the *S&M ROD*.

A) Special Status Species

There are no “known sites” of any special status lichen species within the project area, nor were any found during subsequent surveys.

B) Special Attention Species

There are no “known sites” of any special attention lichen species within the project area, nor were any found during subsequent surveys

*Bryophytes:*

Inventory of the project area for survey and manage bryophytes was accomplished in accordance with the survey protocols as described in *Survey Protocols For Survey and Manage Component 2 Bryophytes*, version 2.0, December 1997 and *Survey Protocols for Protection Buffer Bryophytes*, version 2.0, December 1999.

A) Special Status Species

There are no “known sites” of any special status bryophyte species within the project area, nor were any found during subsequent surveys.

B) Special Attention Species

There are no “known sites” of any special attention bryophyte species within the project area, nor were any found during subsequent surveys

*Fungi:*

Inventory of the project area for survey and manage fungi species were accomplished in accordance with the survey protocols as described in *Survey Protocols for (Bridgeoporus nobilissimus) Fungi*, version 2.0, May 1998.

A) Special Status Species

There are no “known sites” of any special status fungus species within the project area, nor were any found during subsequent surveys.

B) Special Attention Species

A pre-field review determined that suitable habitat for *Bridgeoporus nobilissimus* does not exist within the project area. However, surveys conducted within the project area identified the following new fungi know sites.

Category B species:

Ramaria araiospora, R. stuntzii, Phaeocollybia californica, P. dissiliens, P. piceae, P. scatesiae, P. sipei, P. spadicea, P. olivacea, Gomphus clavatus, Clavariadelphus occidentalis and Gymnopilus punctifolius.

Category D species:

Phaeocollybia attenuata, P. fallax, Craterellus tubaeformis, Cantharellus subalbidus and Sparassus crispus

Category F species:

Otidea onotica, Plectania melastoma and Gyromitra esculenta

Others known sites of interest that are not listed under the *RMP* or the *S&M FSEIS* include: Phaeocollybia radicata, Phaeocollybia phaeogaleroides, P. benzokauffmanii, P. Redheadii, P. tibiikauffmanii and Ramaria botrytoides.

Noxious Weeds:

The following noxious weeds are known from within or adjacent to the project area, Tansy ragwort (*Senecio jacobaea*), bull and Canadian thistles (*Cirsium vulgare* and *C. arvense*), St. Johnswort (*Hypericum perforatum*) and Scotch broom (*Cytisus scoparius*).

## Vegetation: Environmental Consequences

### Alternative 1 (Proposed Action)

- Development of desired stand and individual tree characteristics would be accelerated in the following ways:

Restored structural complexity of the stands: The proposed action would increase the amount of light penetrating the canopy. Increased light levels would promote growth and development of vegetation found at mid canopy and ground levels. It is expected that understory initiation of shade tolerant conifers associated with canopy layering would be promoted in areas of increased light over the long term. Relative density (RD in Tables 3A-3I) is an indicator of mortality from competition. RD in all units is lowered to 0.4 or lower by density management. A lower RD indicates a higher chance for understory development. RDs in all units in 30 years are lower for treated stands compared to untreated stands. In the short term a more complex understory would develop, consisting of more shrub species.

Using a diameter limit as a marking guide would increase the horizontal diversity of the stands. All trees within the diameter limit would be removed without regard for spacing, increasing the clumpiness and uneven spacing of the remaining trees.

Accelerated development of desired tree characteristics: Residual trees, including those in the conifer release areas (see Map 1), would increase in diameter and crown depth/width. Limb diameter on large limby trees would be maintained by releasing those trees to an open grown condition. The long-term results of density management would be larger average DBH, and larger crowns (higher crown ratios) at any given age, compared to the no treatment option. As Tables 3A-3I indicate, diameters 30 years in the future in the treated stands would range from 11 to 34 percent larger, (DBH increase is lowest where densities remain highest). Crown ratios, which are indicators of wind firmness and crown depth would range from 18 to 29 percent higher.

Tables 3A-3I: Current and Future Stand Conditions, With and Without Density Management<sup>1</sup>

Table 3A: UNIT 1

Treatment <sup>2</sup>	Age	Trees per Acre conifer/total	Avg DBH	Basal Area (BA) <sup>3</sup>	% BA removed	Relative Density (RD) <sup>4</sup>	Crown Ratio
Current Stand	47	213	13.6	234		.72	.41
No Treat	77	155	20.0	381		.99	.24
	122	91	28.0	436		1.0	.18
Cut 7-16" (Upland)	47	53	19.6	114	51%	.31	.5
	77	53	30.5	278		.63	.33
	122	53	35.9	393		.83	.2
Cut 7-14" (SIZ) <sup>5</sup>	47	77	18.1	143	39%	.40	.47
	77	75	26.3	295		.70	.31
	122	67	31.4	386		.85	.19

All notes can be found at the bottom of Table 3I

Table 3B: UNIT 2

Treatment <sup>2</sup>	Age	Trees per Acre conifer/total	Avg DBH	Basal Area (BA) <sup>3</sup>	% BA removed	Relative Density (RD) <sup>4</sup>	Crown Ratio
Current Stand	55	173/179	14.1	203		.64	.39
No Treat	85	142/148	20.2	359		.86	.24
	130	86/91	28.5	427		1.0	.21
Cut 7-17" (Upland)	55	38/43	20.3	89	56%	.26	.49
	85	38/43	30.9	218		.52	.38
	130	38/43	37.5	327		.71	.25
Cut 7-15" (SIZ) <sup>5</sup>	55	56/62	19.1	117	42%	.34	.48
	85	56/62	28.5	271		.65	.34
	130	56/62	33.9	391		.87	.23

Table 3C: UNIT 3<sup>6</sup>

Treatment <sup>2</sup>	Age	Trees per Acre conifer/total	Avg DBH	Basal Area (BA) <sup>3</sup>	% BA removed	Relative Density (RD) <sup>4</sup>	Crown Ratio
Current Stand	53	184/209	13.3	207		.70	.36
No Treat	83	134/158	18.5	310		.90	.25
	128	94/115	24.2	382		1.0	.19
Cut 7-17" (Upland)	53	47/72	17.6	109	47%	.36	.48
	83	47/70	24.0	215		.60	.37
	128	47/68	28.9	309		.78	.26

Table 3D: UNIT 4

Treatment <sup>2</sup>	Age	Trees per Acre conifer/total	Avg DBH	Basal Area (BA) <sup>3</sup>	% BA removed	Relative Density (RD) <sup>4</sup>	Crown Ratio
Current Stand	55	134/147	14.9	200		.60	.37
No Treat	85	111/121	21.3	345		.88	.23
	130	84/90	27.9	434		1.0	.18
Cut 7-19" (Upland)	55	43/56	18.9	118	41%	.33	.43
	85	43/54	28.0	253		.59	.31
	130	43/51	34.2	358		.77	.21
Cut 7-18" (SIZ) <sup>5</sup>	55	54/67	18.8	138	31%	.38	.43
	85	54/65	27.2	283		.67	.30
	130	54/61	32.6	393		.86	.20

Table 3E: UNIT 5

Treatment <sup>2</sup>	Age	Trees per Acre conifer/total	Avg DBH	Basal Area (BA) <sup>3</sup>	% BA removed	Relative Density (RD) <sup>4</sup>	Crown Ratio
Current Stand	53	95	17.7	184		.51	.41
No Treat	83	82	25.6	325		.77	.24
	128	70	31.7	420		.92	.16
Cut 7-19" (Upland)	53	43	23.7	132	28%	.33	.51
	83	43	33.7	269		.58	.34
	128	41	39.5	362		.74	.21
Cut 7-18" (SIZ) <sup>5</sup>	53	50	22.9	146	21%	.37	.51
	83	49	31.0	266		.59	.32
	128	48	36.1	350		.74	.19

Table 3F: UNIT 6

Treatment <sup>2</sup>	Age	Trees per Acre conifer/total	Avg DBH	Basal Area (BA) <sup>3</sup>	% BA removed	Relative Density (RD) <sup>4</sup>	Crown Ratio
Current Stand	47	181/209	12.1	184		.59	.44
No Treat	77	155/179	18.9	320		.96	.25
	122	95/107	26.8	398		1.0	.20
Cut 7-14 (Upland and SIZ) <sup>5</sup>	47	62/91	14.4	88	52%	.34	.45
	77	60/86	22.5	234		.67	.33
	122	56/79	28.3	353		.90	.23

Table 3G: UNIT 7

Treatment <sup>2</sup>	Age	Trees per Acre conifer/total	Avg DBH	Basal Area (BA) <sup>3</sup>	% BA removed	Relative Density (RD) <sup>4</sup>	Crown Ratio
Current Stand	48	215/237	12.4	220		.70	.43
No Treat	78	161/177	18.3	368		.99	.27
	123	97/103	25.9	416		1.0	.22
Cut 7-16" (Upland)	48	52/74	15.8	94	54	.31	.47
	78	52/72	23.9	230		.61	.35
	123	52/70	29.1	343		.82	.24
Cut 7-14" (SIZ) <sup>5</sup>	48	76/98	15.6	124	40	.40	.46
	78	76/98	23.0	286		.76	.33
	123	76/93	27.4	412		1.0	.22

Table 3H: UNIT 8

Treatment <sup>2</sup>	Age	Tree per Acre conifer/total	Avg DBH	Basal Area (BA) <sup>3</sup>	% BA Removed	Relative Density (RD) <sup>4</sup>	Crown Ratio
Current Stand	48	215/237	12.4	206		.70	.43
No Treat	78	161/177	18.3	354		.99	.27
	123	97/103	25.9	416		1.0	.22
Cut 7-14" (Upland & SIZ) <sup>5</sup>	48	76/98	15.6	124	40	.40	.46
	78	76/98	23.0	286		.76	.33
	123	76/93	27.4	412		1.0	.22

Table 3I: Unit 9

Treatment <sup>2</sup>	Age	Trees per Acre conifer/total	Avg DBH	Basal Area (BA) <sup>3</sup>	% BA removed	Relative Density (RD) <sup>4</sup>	Crown Ratio
Current Stand	52	183/209	13.0	199		.67	.37
No Treat	82	142/165	18.9	349		.98	.24
	127	90/102	26.0	410		1.0	.19
Cut 7-16" (Upland)	52	52/78	15.7	100	50%	.33	.44
	82	50/73	23.9	239		.63	.33
	127	48/69	29.7	347		.83	.23
Cut 7-15" (SIZ) <sup>5</sup>	52	65/91	15.6	117	41%	.39	.44
	82	62/86	23.4	269		.71	.32
	127	61/81	28.5	384		.93	.22

1. In order to compare results of the proposed treatments versus no treatment, the stands were modeled using Organon, SMC, version 1.0, a growth and yield model developed by OSU. Numbers generated by growth and yield models can be used as a relative comparison of treatments in a given stand, but are not necessarily accurate predictions of future growth. Future stand measurements are dependent on disturbance patterns and other stochastic events which can never be accurately predicted.

2. Conifers considered for treatment are Douglas-fir and Western Hemlock, presented as trees per acre.

3. Basal Area as measured in square feet is defined as total cross sectional area of the conifer trees in the stands.

4. RD (relative density) is a ratio: trees per acre in a stand adjusted to a 10 inch diameter, divided by the number of trees per acre in a fully stocked stand 10 inches in diameter (595 for DF). 0.35 is the point where growth slows from competition. 0.6 is the point where competition begins to cause mortality.

5. SIZ= Stream Influence Zone (see Water/Riparian section for a complete description and explanation for differing prescriptions).

6. There is no SIZ in Unit 3.

- Opening up the canopy may cause ground level microclimatic changes such as increased light levels, increased temperatures, higher humidity and increased wind speed. These effects vary depending on aspect, slope and vegetation removed and are difficult to quantify. Preliminary data from some studies show that these effects are generally limited to the first 50 to 75 feet from a stream. It is expected that most of these effects adjacent to streams would be mitigated by the 50 foot minimum stream protection zone, and that those that occur would be of short duration and would be ameliorated as crowns close and brush covers the ground.
- There would be a short-term elevated risk of Douglas-fir bark beetle infestation in healthy standing trees, due to unyarded cut trees, windthrow, and logging damage to residual trees. Bark beetle infestation risk would be minimized by following guidelines developed for the

Siuslaw National Forest. A summary of those guidelines is attached (Appendix D).

- **Special Status Species:**  
The proposed action would not affect any special status vascular plant, bryophyte, fungi or lichen, species since none were found or are known from the project area.
- **Special Attention Species:**  
All known sites for Special Attention species not receiving any special protection may be extirpated, particularly if the species host tree is selected for removal. Known sites not receiving any protection whose host tree is not selected for removal may survive. Special Attention species protected from all ground disturbing activities are anticipated to survive.

Category F special attention fungi would not receive any protection. These species are fairly common and widely distributed or not associated with late-successional forests. All are currently being evaluated to be removed from the special attention species list of concern.

All category B and D special attention fungi species known sites would be protected by a minimum 50 foot radius buffer or included within riparian or other reserve areas located outside of the proposed thinning area.

The following fungi species would also be protected with a 50 foot radius buffer: *Phaeocollybia radicata*, *P. phaeogaleroides*, *P. benzokauffmanii*, *P. Redheadii*, *P. tibiikauffmanii* and *Ramaria botrytoides*. None of these species is listed as either Special Attention or Special Status fungi species. However, they should be considered as "uncommon" to "rare" and would be protected as special attention fungi species known sites. Several of these species are new to science and would be protected until their distribution and abundance is known. One species, *Ramaria botrytoides* is an eastern species that has been found in a few locales in the Marys Peak Resource Area. Another species, *Phaeocollybia radicata* may represent one known site of only a few sighting since the early 1900's.

- **Noxious Weeds:**  
Noxious weeds found in the proposed project area are priority III noxious weeds and are well established and widespread throughout the Mary's Peak Resource Area and the Salem District. Eradication is not practical using any proposed treatment methods. Grass seeding exposed soil areas tends to decrease the establishment of noxious weeds. Any adverse effects from noxious weeds are not anticipated. The risk rating for the long-term establishment of noxious weed species and consequences of adverse effects on this project area is low.

Environmental consequences are described for the following alternatives only where they differ from Alternative 1.

### **Alternative 2 (Reduced Acres)**

Alternative 2 would increase the area of skyline yarding and decrease the area of aerial yarding. All density management prescriptions would remain the same and environmental consequences would not change from alternative 1.

### **Alternative 3 (No Yarding)**

- Development of desired stand characteristics would be accelerated by restoring structural complexity of the stands, accelerating development of desired tree characteristics, and accelerating development of desired snag, CWD and instream LWD characteristics, as outlined in Alternative 1, above.
- There would be little or no soil disturbance as no cut trees would be yarded.
- Opening up the canopy may cause the same ground level microclimatic changes as outlined in Alternative 1, above.
- Douglas-fir bark beetles are attracted to freshly killed Douglas-fir trees over approximately 8 - 12 inches in diameter. It has been observed that disturbances which produce large numbers of dead trees can cause a population build-up in bark beetles, and result in infestation of adjacent healthy trees. If all cut trees were to remain in the proposed project area, there is a high risk that such an infestation could occur, which could result in killing many of the reserved trees as well as green trees outside the proposed treatment area. Removal of the cut trees would likely reduce this risk.

### **Alternative 4 (No Action)**

- There would be no short-term elevated risk of bark beetle infestation. However, as stand health is compromised due to high densities, risk of long-term bark beetle infestation is increased.
- Stand mortality due to competition would increase, creating increased amounts of small CWD, snags and instream LWD.
- Trees would continue at their present rate of growth, slowing as the canopy closes and competition for light becomes more intense.
- Crown ratios would decrease at a faster rate compared to Alternative 1. Wind firmness and individual tree stability would decrease as crown ratios decrease.
- The canopy would remain closed, allowing little light to penetrate to the ground. The relative density (RD) of the stands as modeled on Organon would range from .77 to .99 if

left untreated for 30 years (Tables 3A-3I). 0.6 is considered the point where mortality due to competition begins. Therefore it can be concluded that no significant understory would develop within the next 30 years and beyond without density management.

- Natural disturbance would be the agent for creation of stand structural diversity. The most likely agent for this disturbance would be wind, which would create openings in patches. It is unknown how long it would take for natural disturbance to create the structural and species diversity needed in this watershed, but it is expected, based on experience and a considerable body of research, that this diversity would take considerably longer to develop than if the proposed treatment were implemented.
- Special Status Species:  
The proposed action would not effect any special status vascular plant, bryophyte, fungi or lichen, species since none were found or are known from the project area.
- Special Attention Species:  
No habitat would be altered under this action. No habitat would be improved or lost for any special attention vascular plant, fungi, lichen or bryophyte species.
- Noxious Weeds:  
No mechanical disturbances would occur in the proposed project area. Habitat for these species would remain low. Any established noxious weeds or non-native species would invade the areas currently dominated by native shrubs and forbs.

## **C. Wildlife**

Issue: Effects on terrestrial habitats within the project area and across the watershed. Effects on wildlife species which BLM, by law and policy is required to protect, maintain and recover.

### **Wildlife: Affected Environment**

#### Wildlife Habitat and Species Concerns

This proposed project area occurs in mid-seral (40-60 years old) forest stands within the Upper Alsea 5<sup>th</sup> Field Watershed. A summary of forest habitat conditions presented in the *Watershed Analysis - North Fork Alsea River* (USDI-BLM 1996; covers north half of Upper Alsea Watershed) shows that 10,618 acres (25.3 percent) of the North Fork Alsea Watershed is composed of mid-seral habitats. About 4,487 acres of this habitat lies on Federal Lands (21.4 percent of 21,003 acres).

The forest stands on BLM lands within 1 mile of the proposed treatment units (2,694 acres) are composed primarily of early- to mid-seral conifer and mixed conifer/hardwoods (87.3 percent, 2,353 acres), with only one regenerating clear-cut patch (2.3 percent, 62 acres), and a few scattered

mature (6.4 percent, 172 acres) and old-growth patches (3.7 percent, 99 acres). The private lands within 1 mile of these proposed units (4,850 acres) are composed mostly of early- and mid-seral conifer and hardwood forests (64.9 percent 3,148 acres) and numerous recent clear-cut patches (32.6 percent, 1,581 acres). Mature forest patches make up less than 1 percent of private lands, and there are no old-growth patches remaining on private lands in this vicinity. However, many of the mid-seral stands on both private and BLM lands have a component of old-growth trees widely scattered or sometimes clumped within them.

The *North Fork Alsea River* watershed analysis found that the structural components of forest habitat that were of most concern within this watershed were: large hard snags, coarse woody debris (CWD), development of sub-canopy layers, and tree species diversity. These structural components are generally not well represented in the mid-seral stands that are the target of this project. The proposed treatment units are composed primarily of moderate to high density conifer stands with some localized pockets of species diversity. Some of the proposed units have remnant old-growth trees remaining as small clumps or scattered individuals. The legacy of fire history and salvage harvests in this area has resulted in moderate to high accumulations of large down logs in advanced stages of decay, with a few large hard snags (dbh greater than 20 inches). Root rot pockets are widely distributed across some of these stands, and along with wind-throw and stem exclusion processes, are contributing modest amounts of small diameter snags and down logs. The proposed treatment units do not contain any significant special habitat features. However, some special habitats (e.g. wetlands and seeps) do exist adjacent to the proposed units.

A great variety of wildlife species may use these mid-seral forest habitats. Most of these species can utilize a broader range of habitat conditions than those species associated with old-growth or early-seral habitats. The *North Fork Alsea River* watershed analysis found that the primary concern for wildlife species within this watershed was the greatly reduced and fragmented condition of the remaining old-growth habitat, only 1,796 acres (4.3 percent of watershed). Whereas, the mid-seral habitats are quite abundant, making up more than 25 percent of the current forest habitat within the watershed. About 45 percent of the treatment area falls within Riparian Reserves boundaries. However, the habitat conditions of the uplands (outside of Riparian Reserve) are essentially identical to habitat conditions within the Riparian Reserve Boundaries for these treatment units. Actual riparian zone habitat, where present, usually exists within just a few meters of a stream. This habitat type was excluded from treatment boundaries, except in three small patches totaling about 7 acres, where conifer release is proposed. No roost sites for bats, other than large snags, are known within or adjacent to the project units.

A Biological Evaluation (see Analysis File) was completed that addressed all special status species likely to occur within the Marys Peak Resource Area which might be affected by the proposed project. From that evaluation, only the following species groups are discussed concerning their affected environment and environmental consequences related to this proposed action:

- Federally listed wildlife species (species covered by Endangered Species Act)
- Survey and Manage (S&M) wildlife species (red-tree voles, mollusks)

- Riparian Reserve species (amphibians, bats, mollusks, animals mentioned above)
- Pertinent bird and mammal species (other species not mentioned above)

#### Federally listed Species.

In the early 1990's, the northern spotted owl and marbled murrelet were listed as Threatened under the Endangered Species Act, due primarily to the loss of late-seral habitat occurring regionally within their range. No spotted owl surveys were required for this project evaluation. However, extensive spotted owl surveys have been completed within the vicinity of the project area by private timber companies and by federal researchers. Spotted owls have been detected in this project area since 1997, including detections adjacent to Unit 4 and 6 in 1998 and 2001. In the spring of 2000, a spotted owl pair was found occupying BLM lands in Section 17 (about 0.5 miles from Unit 9 and 1.0 miles from Unit 8). These owls were determined to be non-nesting in 2000 and 2001. An analysis of available habitat within the 1.5 miles of this owl site (approximate median home range, USDI-FWS, 1992), indicates that there are about 140 acres (3 percent) of suitable habitat (stands over 80 years old), and 3,430 acres (76.2 percent) of dispersal habitat (early- to mid-seral stands 35 to 80 years old). The proposed treatment units cover about 6 percent (180 acres ) of the available habitat (suitable and dispersal) within the median home range for this spotted owl site. The large expanse of dispersal habitat on both BLM and private lands has likely been the main factor facilitating movement and foraging for spotted owls at this site. Recent harvests on private lands are encroaching on the core area of this site (within 0.7 miles), and it is likely that about 300 acres of dispersal habitat on private land will be harvested in the core area within the next 10 years. The BLM lands within the project area fall within critical habitat unit OR-47, designated for the spotted owl. Within the North Fork Alsea watershed about 57 percent of BLM lands provide dispersal habitat for owls.

The nearest occupied marbled murrelet site is 1.5 miles west of the Unit 8. Surveys for marbled murrelets were conducted in 2000 and 2001, near remnant old-growth trees that lie in and adjacent to some of the proposed treatment units. The proposed treatment units are not considered suitable habitat for murrelets, but there was some concern that individual old-growth trees and clusters adjacent to the units might provide marginal nesting habitat in an area that has not been previously surveyed for murrelets. Some small patches of suitable habitat lie adjacent to a few of the proposed units in Section 9, and there are additional small patches of suitable habitat within 0.25 miles of the proposed units. During murrelet surveys in 2000, a single murrelet detection was heard in the northwest corner of Section 9. More extensive surveys in 2001 failed to detect murrelets at any of the survey stations. Thus, it is very unlikely that murrelets use any part of these proposed units for nesting. The BLM lands in the project area fall within critical habitat unit OR-04-k which was designated for marbled murrelets. The silvicultural prescription and design features for the proposed units would not modify any constituent elements of this critical habitat unit.

### Survey and Manage Species.

The Survey and Manage (S&M) wildlife species most likely to occur within the project area include at least three mollusk species (snails and slugs) and the red tree-vole. The recent *Record of Decision* concerning management of S&M species (referred to as *S&M ROD*; USDA-FS and USDI-BLM, 2001) removed two mollusk species (papillose and blue-grey tail-droppers) from the S&M list (Table 1-2, *S&M ROD*). Over 350 acres were surveyed to protocol for S&M mollusk species in the late fall of 2000 (see IM OR-98-097: *Survey and Manage Survey Protocols - Mollusks*). One blue-grey tail-dropper and one papillose tail-dropper were found. Since these species were removed from the S&M list and have been found to be well distributed within the Upper Alsea watershed, no reserve habitat was designated for these newly found sites.

Most of the proposed treatment area does not require surveys for red tree voles due to the young age and small tree size (average dbh <16 inches in these stands). With the exception of unit 9 (Section 21), these stands have scattered remnant old-growth trees in or adjacent to them. Therefore surveys were conducted in all proposed units, except Unit 9. Surveys were conducted in accordance with current protocol (see IM-OR-2000-037: *Survey and Manage Protocol - Oregon Red Tree Vole, Version 2.0*, dated February 18, 2000). Five active red tree vole sites were found in or adjacent to proposed units. Unit boundaries were subsequently adjusted to exclude all red tree vole sites in accordance with current management recommendations (see IM-OR-2000-086: *Management Recommendations for the Oregon Red Tree Vole Arborimus longicaudus*, Version 2.0 September 27, 2000). Red tree voles appear to be well distributed in mid-seral and mature stands throughout the Upper Alsea River basin; they have also been detected in the prey remains gathered at the adjacent spotted owl site.

### Riparian Reserve Species.

These wildlife species or species groups were identified in the *FEIS* as benefitting from the habitat conditions and connectivity afforded by forest stands inside the Riparian Reserve land use allocation. These species include all mollusks, all amphibians, several bat species, American marten, red tree voles, northern spotted owls, and marbled murrelets. The affected environment for spotted owls, marbled murrelets, red tree voles, and the terrestrial mollusk species of concern has been discussed above. Several amphibians including both terrestrial and aquatic species are known to occur within the watershed and likely occur within the project area. Incidental observations have detected rough-skinned newts and red-backed salamanders in or adjacent to the project area. The terrestrial amphibians require adequate forest cover, CWD, and dispersal corridors connecting to similar or better quality habitats. Several bat species are known or likely to occur in the watershed. Some of these species require caves or man-made structures (mines, bridges, buildings) for roost sites and maternal colonies. Some species roost in the forest on foliage, under bark, or in cavities created in old-growth trees, large snags, or down logs. The American marten is a carnivore in the weasel family that is very rare in the Oregon coastal range. It is believed to prefer large patches of late-seral and old-growth forest where it preys mainly on smaller mammals and utilizes large CWD for dens. The older forest patches farther west and northwest of the project area may provide

suitable habitat for this species. However, there are no known sites for this species within this watershed. Populations of all of these riparian reserve species are suspected to be very localized or declining across the region due to loss of riparian zone habitats, fragmentation of late-seral forests, and loss of high quality CWD.

#### Pertinent Bird and Mammal Species.

Pertinent bird species likely to occur within the project area include forest raptors, neotropical migratory birds, and several woodpecker species. No surveys are required for these species. The forest raptors such as the goshawk, Cooper's hawk, and sharp-shinned hawk are known to utilize forest stands similar in age and structure to the project area. These species may nest in these stands and forage for birds and small mammals within the forest or adjacent open habitats. Changes in forest structure by harvesting or through natural succession can cause these species to abandon historic nest sites. No known nest sites for these species are known of within or adjacent to proposed units; nor were any active nests found during project planning visits to the area. Cooper's and sharp-shinned hawks have been observed during the breeding season within the vicinity of the project area. Several species of neotropical migratory songbirds are known to occur and likely nest within the proposed units. Some of these species are believed to be declining regionally due to loss of habitat on their breeding grounds and wintering grounds (Central and South America). Most of these species are insectivorous and make use of a variety of forest habitats. Hardwood stands may be especially important to some species for nest sites and foraging habitat. Several woodpecker species have been observed within and adjacent to the project area. These species which excavate cavities in snags and down logs, may be limited by the distribution and quality of coarse woody material across the landscape.

Pertinent mammals of concern include the white-footed vole, and big game species such as deer, elk, and bear. The white-footed vole is a very rare and relatively unknown small rodent that has been documented within similar forest stands along tributaries of the South Fork Alsea River. Heavy brush, large CWD, and a prominent hardwood component appear to be important elements of its habitat. The proposed units including the proposed stream enhancement area may provide some of this type of habitat. Deer and elk use of the project area has been observed during project planning visits to the area. Deer use of the project area appears to be moderate, while very little elk use was noted in any of the units. Black bears are also likely residents within the project area. They often utilize the large clusters of down logs as den sites and, upon emerging in the Spring, may cause some damage to younger Douglas-fir trees as they tear into the bark to feed on the cambium layer. A few old bear-damaged trees were noted during project planning visits, and some existing large CWD may provide adequate denning habitat for this species.

#### Terrestrial Snags/ Course Woody Debris (CWD)

As Table 4 indicates, the project area meets *LSRA* cubic foot CWD requirements. However, CWD in decay classes 1 and 2 are generally lacking.

Table 4: Coarse woody debris conditions and prescription within the Klickitat Tie Project Area <sup>1</sup>.

Proposed Unit	Down Wood (Cubic ft/Ac)		Snags (> 10" Ht & > 10" DBH)		Treatment Prescription <sup>2</sup>
	All Species	Conifers Only <sup>3</sup>	# snags per acre	Size (avg dbh)	# trees per acre
1	2,248	2,248	5.0	12.0"	2
2	3,636	3,558	14.4	12.8"	2
3	7,772	6,728	10.1	23.7"	1
4	6,329	6,094	8.1	26.2"	1
5	16,931	12,264	2.8	27.9"	3
6	6,304	6,104	20.8	15.9"	2
7,8	5,401	5,392	7.8	13.1"	2
9	4,564	3,519	13.4	12.7"	2
	53,185	45,907			
<sup>1</sup> Data was obtained from Silvicultural Prescription and represents the current condition of down wood and snag conditions as summarized from forest stand surveys conducted in 1999. <sup>2</sup> Desired Input of CWD is expressed as the number of trees per acre created in the Unit. Post-harvest processes (wind throw, beetle kill, etc.) would be evaluated prior to input, and snag creation would be favored over creating downed logs.					

## Wildlife: Environmental Consequences

### Alternative 1 (Proposed Action)

#### Direct and Indirect Impacts.

#### Wildlife Habitat

The proposed action and associated activities would change the existing forest structure and alter the development of future forest stand conditions in the proposed treated units. The direct and indirect changes anticipated to occur to forest habitat characteristics are:

#### Short-term (less than 10 years)

- light to moderate reduction of canopy closure (resulting canopy more than 40 percent) over entire treatment area, which represents less than 7 percent of the mid-seral forests on BLM lands within the watershed;
- minor reduction and disturbance to existing CWD material (snags and down logs)

- resulting from felling yarding and road construction;
- creation of new hard CWD of optimal size and quality for available stand conditions (see Table 4, above);
- retention and enhancement of hardwood tree and shrub diversity on all but 7 acres of the treatment area;

#### Long-term (more than 10 years)

- transition in structural characteristics of the treated stands to more closely resemble late-seral forest habitat (larger diameter trees, sub-canopy development, greater tree species diversity, greater volume and size of hard CWD);
- extended persistence of hardwood tree and shrub cover diversity;

While treatment would occur within the Riparian Reserve allocation, no appreciable effects are anticipated to occur to riparian zone habitats or to existing remnant older trees and snags within or adjacent to project units. All other activities that are likely to occur in association with this proposed action are not expected to diminish the structure or suitability of habitats within or adjacent to the proposed units, unless otherwise described below.

#### Federally listed wildlife species

Suitable habitat for spotted owls and marbled murrelets would not be affected by this action. Nor would any of the constituent elements of Critical Habitat for these species be affected by this action. The resulting effects on prey species (abundance and vulnerability) may be temporarily degraded for the adjacent resident spotted owls that might currently use this stand. The proposed treatment units amount to about 6 percent of the available forest stands within 1.5 miles of the spotted owl site. The forest stands that currently provide dispersal habitat would still function as such after treatment, since the average canopy closure would remain above 40 percent. For these reasons the proposed action is considered a “**may affect, but not likely adverse affect**” to spotted owls. Noise created by power equipment use to facilitate project activities is unlikely to disturb spotted owls since no nest sites have been found within 0.25 miles of the proposed treatment units by the on-going survey efforts. No suitable marbled murrelet habitat would be altered by this action, and protocol surveys for murrelets within and adjacent to the proposed units has not detected any occupancy behavior. A single murrelet detection adjacent to the north half of unit 6 may indicate presence of murrelets in adjacent older forest patches (within 0.25 miles). The proposed action is considered a “**may affect, likely adverse affect**” to marbled murrelets since noise disturbance may occur during the critical part of the nesting period (April 1 to August 5) within 0.25 miles of habitat that may be occupied by murrelets. To address concerns for federally listed wildlife species, consultation was completed with the U.S. Fish and Wildlife Service, under the *Programmatic Biological Assessment of Fiscal Year 2001 Projects in the North Coast Province which would modify the habitats of Bald Eagles, Northern Spotted Owls, or Marbled Murrelets* (August 11, 1999). A final Biological Opinion was received on October 4, 2000, which concluded that the entirety of the planned actions for the fiscal year were not likely to result in

jeopardy to these listed species. This Biological Opinion will remain in effect for fiscal year 2002 timber sales. All applicable terms and conditions from the Biological Opinion would be incorporated into the project design features for this proposed action.

#### Survey and Manage.

Active red tree vole sites were found and protected in the project area. These sites were protected with reserve areas that are much larger than recommended, incorporating most of the contiguous patches of mature conifer forest on BLM lands in the project area. Red tree voles appear to be well distributed within this watershed and can utilize younger age forest stands that are currently abundant within the project area. For these reasons, this S&M species is not likely to be significantly affected by this proposed action, and no additional protective measures are warranted. No S&M mollusk species were found within the project area and very few of these species are known of within this watershed. Habitat that may be more suitable for S&M mollusks (e.g., late-seral forests, old-growth patches) adjacent to the project area would not be affected by this action. Therefore, no impacts are anticipated to S&M mollusk populations from the proposed action.

All the remaining wildlife species discussed in the affected environment are **not likely to be substantially affected** by this proposed action, so as to contribute to their decline or elevate their status for concern for the following reasons:

- mid-seral habitat is abundant within this watershed and only a very small percentage (6.5 percent) of this habitat would be affected by this action;
- the existing habitat in the proposed units would not be removed, but rather it would be retained and continue to provide habitat for the majority of species currently present;
- existing corridors for movement through Riparian Reserves would not be diminished;
- species of concern that may occur within the project area either do not make significant use of this habitat type or their use of this habitat is dependent on structural components (canopy closure, hardwoods, snags and down logs, existing stick nests) that would not be substantially diminished within the local landscape;
- and lastly, the resulting CWD creation and stand structure development would likely improve the quality of this habitat for most species.

#### Terrestrial CWD and Snags

Desirable terrestrial snag and CWD characteristics would be enhanced in two ways:

1. Trees smaller than stand average and at a consequently higher risk of mortality, would reach an average 20 inches DBH more quickly, compared to the no treatment option, creating natural opportunities for larger snag/CWD formation.
2. CWD and snag enhancement would be achieved using a combination of strategies #2 and #3 as described in the *LSRA* (p.68). This strategy creates some short term CWD and snags,

but reserves most as green trees to maximize long-term quantities and sizes of CWD and snags. Post harvest monitoring would be accomplished to evaluate the size and condition of snags and CWD. It is expected the harvest operation would create some CWD and possibly knock down some snags. Creation of CWD during harvest could come from harvest activities, post harvest windthrow, and beetle kill. The monitoring would be done three to five years after the harvest has maximized opportunities for natural creation of CWD and snags. After monitoring, 1 to 3 trees per acre would be cut and left where needed to supply hard CWD/snags (Table 4).

### **Cumulative Impacts.**

Within the North Fork Alsea Watershed, BLM has commercially thinned about 350 acres of mid-seral forest stands within the past 10 years (less than 2 percent of BLM ownership in watershed). In the next 5 years, BLM would evaluate commercially thinning and density management of about 1000 acres (in addition to this proposed action) of mid-seral forests within this watershed. Due to ecological succession and forest management (mostly private land harvests), the amount of habitat in each seral stage within this watershed is not stagnant, but constantly in transition from early open habitats toward mature forest stands. For example, ecological succession would move about 48 percent (6,200 acres) of the mid-seral habitat toward late-seral forest conditions over the next 20 years (these are federal lands designated as LSR); while clear-cut harvests on private lands will likely remove the remaining 52 percent (6,700 acres) of this habitat, setting it back to an early-seral condition. During this same time frame, about 12,700 acres of habitat that is currently in an early-seral condition will develop toward mid-seral habitat. While thinning harvests such as the proposed action do alter forest structure, these treatments do not result in a loss of habitat for most of the species of concern that are known or suspected to use these forests. The cumulative impact on habitat availability for species of concern resulting from past BLM thinning harvests and foreseeable thinning treatments is considered negligible.

### **Alternative 2 (Reduced Acres)**

This alternative would treat fewer acres than Alternative 1. The reduced treatment area and reduced ground disturbance would lessen the risk of short-term impacts to wildlife species and habitats. The reduced treatment area might also lessen the degree of desirable structural development which could diminish the intended attainment of LSR values in this vicinity.

### **Alternative 3 (No Yarding)**

This alternative would affect the same amount of treatment area as Alternative 1, but would leave all cut trees in place as coarse woody debris. No additional road construction would be necessary, thereby reducing ground disturbance. Initially, the direct affects to forest habitat would be similar to Alternative 1. However, the huge immediate input of fresh CWD within the project area would present a substantial risk of bark beetle outbreaks that could further reduce canopy closure on BLM lands and cause unacceptable damage to adjacent private forest stands.

#### **Alternative 4 (No Action)**

This alternative would result in no change to the affected environment. The potential short-term impacts to species as described in Alternative 1 would be avoided. However, immediate gains in forest structure would not be achieved.

#### **D. Soils**

Issues: Effects on long term site productivity. Effects on surface disturbance and erosion.

##### **Soils: Affected Environment**

The predominant soil series on and around these sites is: Klickitat gravelly clay loam, there are also a few areas with Honeygrove clay, Hatchery gravelly loam and Digger gravelly loam. Slopes on the majority of the sites varies from 30 percent to 70 percent with a few flatter areas and some inclusions of short side slopes up to approximately 85 percent. Moderate to severely compacted soils have persisted in a few scattered existing skid trails that date back to the original tractor logging that was done in portions of the site in the 1940's. There is some brush growing in most of the trails. Large trees are present mostly along the edges of the trails, very few large trees are growing in the trails themselves. The skid trails are generally under 10 feet in width so the stands are generally fully occupied by tree canopies.

Klickitat soils are deep, well-drained, gently sloping to extremely steep soils formed in alluvial and colluvial materials derived from basalt. They are found on Coast Range sites at elevations of 500 to 4000 feet. Typically the surface layer is a dark reddish-brown gravelly clay loam about 8 inches thick. The sub-surface soil is a reddish-brown very gravelly clay loam about 20 inches thick grading to a sub-soil of dark-brown very gravelly loam about 18 inches thick. Fractured basalt is at a depth of about 45 inches.

Honeygrove soils are deep, well-drained soils that developed in colluvial materials derived from sedimentary and basalt rocks. These soils evolved in hilly to mountainous topography with broad, rolling tops and steep side slopes. Slopes are 3 to 50 percent. Honeygrove soils are found on Coast Range sites at elevations from 750 to 1000 feet. The surface soil is a dark reddish-brown silty clay loam about 8 inches thick. The sub-surface soil is a dark reddish-brown and dark red silty clay and clay extending to a depth of 60 inches or more. Native vegetation includes: Douglas fir, bigleaf maple, salal, ocean spray, hazelnut, and fern.

Hatchery soils are moderately deep, well-drained, moderately steep to extremely steep soils formed in alluvial and colluvial materials derived from basalt. They are found on Coast Range sites at elevations of 250 to 1500 feet. The surface layer is a dark brown gravelly loam about 9 inches thick. The sub-soil is a dark reddish-brown gravelly loam about 23 inches thick. Underlying material is fractured basalt.

Digger soils are moderately deep, well-drained, gently sloping to very steep soils that developed in alluvial and colluvial material derived from sandstone. They are found on Coast Range sites at elevations from 200 to 1800 feet. Typically, the surface soil is a dark greyish-brown and dark brown gravelly loam about 4 inches thick. The subsoil, about 26 inches thick, is a brown gravelly loam that is about 45 percent pebbles and cobbles. The underlying material is fractured sandstone that has soil material in the fractures.

## **Soils: Environmental Consequences**

### **Alternative 1 (Proposed Action)**

In general, on the moderate slopes and broader, more stable ridges with slopes ranging from 0 to 40 percent the soils are deep gravelly loams and loamy clays with thick top soils. As the slopes steepen, the soils begin to change to moderately deep gravelly loams with thinner top soils. With slopes over 70 to 80 percent, the surface soil becomes less stable and is subject to dry raveling when the vegetation and litter layer is removed. Steeper areas would be excluded from the project for the most part. Any activity on these steeper areas would only involve removal of a few trees leaving the majority of the vegetation and litter layer intact. No significant increase in dry ravel rates would occur from this type activity.

There are two management concerns with these soils: the potential for compaction and the potential for surface erosion and dry ravel.

Due to the substantial amount of clay and silt size particles in these soils, they easily compact when moist or wet and subjected to pressure from heavy equipment, dragging logs, etc. Once compacted, fine textured soils are very slow to recover, as is evidenced by the scattered existing compaction on site, dating to the 1940's. Compaction of the soil can reduce site productivity by limiting and/or restricting root growth in the compacted soil as well as limiting movement of O<sub>2</sub>, CO<sub>2</sub> and H<sub>2</sub>O into, out of and within the soil. Depending on the extent and degree of compaction, some reduction of site productivity can be expected. In addition to reduced site productivity, on compacted steeper sites (over 35 percent), the reduction in the water infiltration rate can result in rapid rates of surface water accumulation and run off. On bare soil the hazard of erosion can be high. Minimizing compaction of soils in the project area and maintaining vegetation, litter and debris on the soil surface should be a high priority, especially on the steeper areas since the proposed harvest methods for nearly all of the project area is cable or helicopter, most of the vegetation would remain, along with slash from thinned trees. Expected levels of soil compaction and disturbance and surface erosion should be minimal as a result of the proposed project activity.

### Roads:

Constructing 2773 feet of new road (1528 feet of which would be decommissioned after use) and reconstructing 300 feet of existing road would result in loss of top soil and compaction of soil on approximately 1½ acres of forested land, converting it to non-forest (about 0.5 percent of the total

project area). New impacts to soils and fuels in the areas where the roads would be reconstructed should be minimal since these areas have already been developed in the past and the compacted surfaces already exist.

#### Logging:

Impacts include the additional area used for landings. For many of the landings, a portion of the existing haul road or the harvest road would be used during operations. Some additional ground adjacent to the road surface would be used for turning equipment and decking logs. The degree of soil disturbance and compaction in areas where logs are sorted or decked is expected to be low. However, at roadside areas where multiple tracking could occur, heavy compaction and disturbance to the top soil layer would be likely.

#### *Aerial Yarding*

No impacts from aerial yarding are expected. Site productivity and stability should be maintained. The percentage of the total project area impacted by surface disturbance and soil compaction as a result of helicopter landing construction and use would be approximately 0.3 percent (approximately 1 acre).

#### *Skyline Yarding*

Skyline yarding roads are expected to comprise about 3 percent of the skyline area or approximately 5 acres and would result in light compaction of narrow strips less than 4 feet in width. This is especially true for this type of project where logs are relatively small and there is adequate slash on the ground in the corridors to yard over. Effect on site productivity from this type of disturbance is minimal. The percentage of the total project area impacted by surface disturbance and soil compaction as a result of skyline yarding and landings is estimated to be approximately 1.7 percent (6 acres.).

#### *Ground Based Yarding*

For ground based yarding, impacts would depend on the size of the crawler tractors used, how dry the soils are when heavy equipment operates on them and how deep the soils are covered with slash in the yarding roads during logging operations (approximately 0.1 percent or approximately 3 acres). Expect a moderate amount of top soil loss (displacement) to occur in yarding roads and higher amounts of displacement on landings.

The severity of compaction can be mitigated somewhat when slash and small logs are left in the skid roads and the total number of passes is low (approximately 6). With tractor skidding, it is much harder to keep slash and debris on the skid roads for more than a few passes, so additional effort would be needed to replace slash and debris on skid roads. Operating only when soils are dry and soil strength is high would help to reduce the amount of crushing of individual soil

aggregates and resulting compaction. Multiple passes on moist or wet soil usually result in rutting and heavy compaction.

### Cumulative Acreage

On the entire project area, the total acreage of soil disturbance from the proposed activities (roads and logging) are estimated to be 7.3 acres (2.1 percent).

Pre-existing roads in the project area cover approximately 8.6 acres or 2.4 percent of the total area. Adding this area to the proposed project impacted area equals 15.9 acres, or 4.5 percent of the total area for the cumulative acreage of soil disturbance from past and present activities.

Following logging, approximately 2.8 acres of road surface (0.8 percent of total project area) would receive one or more mitigating treatments to decommission portions of the roads. Although not totally restoring the soil, these treatments would partially mitigate some of the negative soil impacts thus reducing the total cumulative impacted acres listed above.

Following completion of the project, the area would have less than 4.5 percent of total acreage with some level of unmitigated soil compaction or disturbance. The Salem District RMP lists 10 percent as the maximum acceptable level of aerial extent for soil disturbance / compaction.

### Site Productivity:

For aerial yarding, no effect on overall site productivity is expected (no reduction in yield).

For skyline yarding, the effect on overall site productivity from light compaction on the yarding roads (3 percent of the area) plus moderate to heavy compaction at the landings (1 percent), is expected to be negligible to perhaps 1 percent.

For ground based yarding, if the suggested design measures are followed: (soils are dry, i.e., 25 percent moisture content, and equipment operates on some slash), soil impacts are expected to result in moderate, fairly continuous compaction within the main 8-10 foot wide yarding roads. Impacts would be moderate to heavy in the landing areas and light to moderate on less traveled portions of yarding roads. The effect on overall site productivity from mostly moderate compaction on 10 percent of the tractor area is expected to be 2-4 percent reduction in yield.

Environmental consequences are described for the following alternatives only where they differ from Alternative 1.

### **Alternative 2 (Reduced Acres)**

Impacts essentially would be the same as for alternative 1 with adjustments to the overall percentages necessary since the total project acreage is reduced to 236 from 290. Impacted acres remain the same since helicopter yarding has no measurable soil impacts except for landings

(which stay the same under either alternative). Pre-existing roads in the project area cover approximately 8.6 acres or 3.1 percent of the total area. Adding this area to the proposed project impacted area equals 15.9 acres, or 5.7 percent of the total area for the cumulative acreage of soil disturbance from past and present activities

### **Alternative 3 (No Yarding)**

Since there would be no landing or road construction and no yarding impacts, there would be no increase in disturbed soil. There would be approximately 2.1 acres of road decommissioned which would benefit the site by accelerating the recovery of those acres back to a forested condition.

### **Alternative 4 (No Action)**

Conditions would remain as they are at present. There would be no changes in the aerial extent of disturbed soil. None of the existing roads would be decommissioned.

## **E. Fuels/Air Quality**

Issue: Effects on fuel loading, fire risk and air quality.

### **Fuels/Air Quality: Affected Environment**

The project area is presently occupied by fairly continuous stands of second growth Douglas-fir and western hemlock with varying minor components of western red cedar, bigleaf maple and red alder trees. Stand ages average about 47 to 55 years of age. Undergrowth is a moderate growth of: salal, Oregon grape, vine maple, ocean spray and huckleberry. There is a moderate accumulation of dead woody material on the ground. Small snags are fairly numerous and scattered through the stand. Over the project area as a whole, there are fewer than 2 large snags (over 20 inches) per acre. Based on visual estimates, using GTR-PNW-105, series 1-DF-4 and 3-DFHD-3, the estimated total dead fuel loading for these stands is in the 15-20 tons per acre range. Fuel model for these sites would be model 8 - closed timber litter.

### **Fuels/Air Quality: Environmental Consequences**

#### **Alternative 1 (Proposed Action)**

Fuel loading and fire risk would increase at this site as a result of the proposed action.

Vegetation cleared for road construction would result in creation of approximately 100 tons of slash that would be scattered along the right-of-ways. Most of this material would end up being piled and burned following harvest operations and some would remain scattered in and adjacent to the right-of-way. This would slightly increase risk for a fire start along the right-of-way while the roads are in use but following road closure, after the project has been completed, the increase in

fire risk would be insignificant.

The increase in slash created by the proposed thinning would result in a higher risk of fire on the thinned sites following logging. The increase in fuel loading is expected to be 5 to 15 tons per acre with a discontinuous arrangement. Total dead fuel loadings would range from approximately 15 to 35 tons per acre. The highest fuel loadings would be scattered through the site depending on the distribution of trees cut with the various prescriptions. The fuel model would shift from Model 8 to model 10 or 11. The overall the risk of fire following this action would be moderate. This is due to the moderate topography, the isolated nature of the most of the slash from the roads, the continued existence of a tree canopy shading the fuels, and the higher associated humidity.

Risk of fire would be greatest during the period when attached needles dry out the first season following cutting. These “red needles” generally fall off within one year and fire risk greatly diminishes. Fire risk would continue to diminish as the area greens up and the fine twigs and branches begin to break down. In order to mitigate fire risk, this site should be monitored for the need of closing or restricting access during periods of high fire danger. During the closed fire season the first year following harvest activities (while fuels are in the “red needle” stage) motor vehicle access should be restricted with signs or physically blocked to reduce the risk of fire. Burning of landing piles and slash concentrations along roads would reduce risk of a fire start from human ignition sources.

Burning would be done in the Fall under good atmospheric mixing conditions. Threat of impacting air quality in designated areas would be very low. Any residual smoke should be of short duration and occur during a period of the year when there is less outdoor activity.

Environmental consequences are described for the following alternatives only where they differ from Alternative 1.

#### **Alternative 2 (Reduced Acres)**

Impacts essentially would be the same as for alternative 1.

#### **Alternative 3 (No Yarding)**

Fire hazard would increase significantly due to the increase in fuel loading of heavy fuels along with the fine fuels generated when the trees are felled and left on site. There would also be additional fuels generated over time as bark beetle populations emerge from the large down material and attack adjacent standing timber in the residual stand. High mortality would be expected during the 3-5 years following cutting. Risk of a fire start would diminish after about ten years, however the resistance to control a fire if one should start would remain high for several decades due to the high rate of contact between tree crowns and the amount of large fuels on site.

#### **Alternative 4 (No Action)**

Short-term conditions would remain as they are at present. It is possible that over time, as the volume of small dead wood on the ground increases and the contact between live crowns increases, the resistance to control of a fire may increase.

### **F. Water/Riparian**

Issue: Effects on stream flow, channel conditions, and water quality. Effects on instream LWD recruitment. Effects on attainment of ACS objectives.

#### **Water: Affected Environment**

##### Precipitation and geology of the project area

The project area is located on the southern slopes of Mary's Peak at elevations between 600 to 2,600 feet. As winter storm systems move across the coast range from the southwest, they gain elevation over Mary's Peak which results in a concentration of precipitation on the southern slopes. This orographic effect is reflected in a mean 2-year precipitation event of 5 to 5.5 inches in a 24 hour period, one of the highest in the mid-coast. This elevation range is also subject to rain on snow events, unusual for the coast range, which have the potential to increase peak flows during winter or spring storms.

The project area lies in two sixth-field watersheds: Yew Creek and Ernest Creek. All streams are tributary to the North Fork Alsea River, one-half of the Upper Alsea fifth-field watershed. Bedrock in the project area is composed primarily of the Siletz River volcanics series: a thick sequence of basalt flows, pillow lavas, flow breccias, and pyroclastic rocks formed in a marine environment. Peaks and ridge lines in the area are generally capped by resistant intrusive rocks; primarily gabbro and diorite (so called "mafic intrusives"). Bedrock to the east of the project area is primarily Tyee Formation: thick bedded sandstone and inter-bedded siltstone.

Hillslopes in the project area are generally steep, and mantled with thin, landslide and ravel prone soils. This is particularly true of slopes along the Old Blue ridgeline in section 9. Water storage is low and infiltration and run off quick. Channels here are typically ephemeral or intermittent, "stair step" in form and subject to debris torrents which strip them to bedrock. Many of the tributary channels here are buried in heavy loads of gravel and cobble due to raveling hillsides. Channel substrates are typically cobble and gravel on top of basalt bedrock. Low gradient channels form at junctions of headwater intermittent channels where debris and sediment deposits to form flats and beavers build dams to further slow the movement of water and sediment.

##### Project area streams

There are numerous first order tributary channels in the project area. Channel types (Rosgen, 1996)

on tributaries in the area range from “Aa+” (extremely steep, landslide prone, headwater channels) to “A” channels (narrow, deeply entrenched mountain streams with gradients from 4-10 percent). Debris torrents are part of the natural processes in Aa+ channels and provide much of the sediment and large woody debris (LWD) to lower channels in mountain regions (Mc Garry, 1994).

Yew Creek, a Rosgen A type (greater than 4 percent gradient), perennial, and in functional condition, is the main channel which drains the project area. The A channel type is interspersed with a Rosgen G type (gully, less than 4 percent gradient) at several locations where steep hillsides narrow the valley to a bedrock gorge. Most of the riparian immediately adjacent to Yew Creek, from the confluence with Crooked Creek to its headwaters on Mary’s Peak, has been managed and represents a disturbed condition for this landscape. These riparian stands are characterized by a single-storied canopy of deciduous trees, mostly red alder and willow, and scattered Douglas-fir plantation trees. Canopy openings are numerous and help support a thick understory of vine maple, salal, ferns and salmonberry. The channel has large deposits of small cobble-gravel with intermixed sand and silts backed up behind numerous debris jams. Much of this material appears to have been deposited in the 1950's and by the 1964 flood event following severe disturbance of the hillslopes during harvesting operations of the late 50s and early 60s. The hillslopes below Old Blue mountain (section 4 and 33) in particular are prone to severe raveling and surface erosion. Much of this material has filled the small tributary channels draining the ridge line and is periodically scoured and moved downstream during large storms. This material was scoured and redistributed in the 1996 flood, but compared to 1964, little additional material appears to have entered the system.

#### Project area roads

The vast majority of sediment delivery to streams from roads occurred during the 1950's (when the roads were constructed) and in the 1964 flood event, with a smaller contribution in the 1996 storm. The road surfaces and fills have, with some exceptions, stabilized in the intervening decades and older tractor logging roads have re-vegetated. Trees have fallen across many of the secondary roads in the area which has blocked vehicle access.

#### Project area water quality and beneficial uses

##### *Fine sediment and turbidity*

Occasional turbidity grab samples have been collected since 1995 during winter storm events lower in the two project area watersheds. Lower Yew Creek levels ranged from 0.8 to a high of 110 with a median value of 5 nephelometric turbidity units (NTUs). Crooked Creek (the main tributary below the project area) turbidity levels ranged from 8 to a high of 55 with a median value of 12 NTUs. The higher turbidity measurements at both sites occurred during the 1996 flood, were short-lived, and do not represent normal winter conditions. These turbidity measurements are below the maximum NTU levels found on one study of Mill Creek in the Alsea river basin (Beschta, 1979) and the median values of 5 and 12 NTU are well below the 30 NTU standard Oregon DEQ set for the Umatilla sub-basin Total Maximum Daily Load

Assessment (ODEQ,1999).

During field review of stream channels in the project area, channels were observed to be stable and functional with sediment supplies in the range expected for these stream types. Furthermore, turbidity data indicates that fine sediment supply and transport are within the range of natural variability in these watersheds. However, sampling to date has been infrequent. Currently there is not enough sediment data in these watersheds to provide a detailed representation of water quality conditions. In response to these concerns, physical and biological monitoring in these watersheds is ongoing.

#### *Stream Temperature*

The headwaters of most channels in the project area are ephemeral and do not flow on the surface during most summers. These channels have very little potential to be heated by exposure to direct solar radiation. Perennial channels in the project area include two Yew Creek tributaries in section 9, the Cabin Creek main stem in section 15 and the Baxter main stem in section 21. No stream temperature data was located for these specific channel reaches. However, Upper Yew Creek in section 33 was found in 1999 to be well below the State of Oregon water quality threshold of 17.8°C. In addition, numerous studies have documented stream temperatures in shaded upland streams that are consistently below Oregon's water quality standard of 17.8 °C degrees. One of these studies (*Streamflow, Sediment-Transport, Water-Temperature Characteristics of Three Small Watersheds in the Alsea River Basin*, Oregon, USGS Survey Circular #642, 1971) showed temperatures in three shaded upland channels in the Oregon Coast ranging from 16.6 - 1 °C. Based on field observations and aerial photo reviews of perennial streams in the project area, current stream side vegetation is adequate to shade surface waters during summer base flow, and it is likely that stream temperatures meet the Oregon state standard.

#### *Other Water Quality Parameters*

Additional water quality parameters (e.g., nutrients, dissolved oxygen, pesticide and herbicide residues, etc.) are unlikely to be affected by this proposal and were not reviewed for this analysis (U.S.E.P.A.,1991).

#### *Oregon Department of Environmental Quality (DEQ)*

The Oregon Department of Environmental Quality's (DEQ) 1998 303d List of Water Quality Limited Streams (<http://waterquality.deq.state.or.us/wq/303dlist/303dpage.htm>) is a compilation of streams which do not meet the state's water quality standards. A review of the listed streams for the Alsea subbasin was completed for this report. The project area directly drains to the following listed stream in this subbasin:

North Fork Alsea Mouth to Headwaters

Temperature Standard: Rearing 64 F (17.8 C) Rearing 64 F (17.8 C) Summer

USFS Data (Site near mouth): 7 day average of daily maximums of greater than 64 with a maximum of approximately 70 exceeded temperature standard (64)

The DEQ has also published an assessment, the 319 Report, which identifies streams with potential non-point water pollution problems (1988 Oregon Statewide Assessment of Nonpoint Sources of Water Pollution).

Table 5: *1988 Oregon Statewide Assessment of Non-point Sources of Water Pollution*

	<i>Water Quality Conditions Affecting:</i>				
<i>Basin:</i> Stream	<b>General WQ</b>	<b>Drinking Water</b>	<b>Recreation/ Shellfish</b>	<b>Fish</b>	<b>Aquatic Habitat</b>
<i>Alsea:</i> North Fork	NP	NP	NP	NP	NP

NP = No Problem And/Or No Data

MO = Moderate Problem based on Observation (no collaborating data)

Beneficial uses of surface water from the project area are displayed in Table 6. There are no known municipal or domestic water users in the project area. Irrigation and livestock watering occur in the Alsea valley and in the Muddy Creek valley, several miles downstream from the project area. Additional recognized beneficial uses of the stream flow in the project area include anadromous fish, resident fish, recreation, and esthetic values.

Table 6: *Beneficial Uses Associated with Streams in the Project Area*

<b>Stream (Watershed)</b>	<b>Proposed Activity</b>	<b>Beneficial Use of Water</b>	<b>Approximate Distance Downstream from Project</b>	<b>Information Source</b>
Yew Creek, Baxter Creek and Cabin Creek (North Fork Alsea)	Stand density management	Anadromous fish	< 1 mile	BLM
	Road construction, reconstruction & decommissioning	Resident fish	immediately below project area	BLM
		Domestic use	> 10 mile	WRIS*
		Irrigation/live-stock watering	1-2 miles	WRIS*

1. WRIS = *Water Rights Information System* on the Oregon Department of Water Resources website.

BLM- from field surveys by Marys Peak RA fisheries staff.

## **Water: Environmental Consequences**

### **Alternative 1 (Proposed Action)**

#### **Direct and Indirect Effects**

Measurable effects to stream flow, channel conditions, and water quality due to the proposed action are unlikely. In the short term, this action is unlikely to alter the current condition of the aquatic system either by affecting its physical integrity, water quality, sediment regime or in-stream flows. Some short term, variable increases in stream turbidity may result (discussed below). Alterations in the capture, infiltration and routing (both surface and subsurface) of precipitation may occur as a consequence of the mechanical removal of trees and reductions in stand density. This effect would be difficult to measure and unlikely to substantially alter stream flow or water quality. Any changes in the capture and routing of precipitation would likely return to pre-treatment conditions as the remaining forest fills out. Increases in mass wasting and alterations in sediment regime as a result of this action are of low probability.

#### Road construction and hauling

All the proposed road construction and reconstruction locations have been reviewed in the field for potential effects to water quality. All construction is limited to moderate to low gradient sites (less than 10 percent) outside of riparian reserves. The risk of impacts to water quality related to road construction would be limited by restricting work to periods of low rainfall and runoff. Construction would employ techniques to reduce concentration of runoff and sediment to a minimum, such as water-bars on steeper sections of road and, since no additional stream crossings would be constructed, there would be little opportunity for sediment from these surfaces to enter streams.

The haul routes would be short sections of rocked forest roads to Highway 34, a paved surface. Timber hauling during periods when water is flowing on roads and into ditches could increase stream turbidity if flows from ditches are large enough to enter streams. To limit the risk of fine sediment entry into local streams, most hauling would be restricted to periods of low soil moisture. All season hauling would be allowed on two road systems with measures taken to prevent sedimentation in streams (see Design Features).

#### Tree harvest and yarding

Cable yarding corridors, if sufficiently compacted, may route surface water and sediment into streams. However, several factors limit the potential for this to occur: 1) even if compacted, high levels of residual slash on yarding corridors would contribute to reducing the accumulation of runoff by deflecting and redistributing overland flow laterally to areas where it will infiltrate into the soil, 2) stream protection zones in Riparian Reserves have high surface roughness which functions to trap any overland flow and sediment before reaching streams, 3) the small size of trees

being yarded would limit surface disturbance to minimal levels, and 4) helicopter yarding over much of the area would cause only minimal surface disturbance and limits the extent of yarding corridors.

Tree removal is not proposed on steep, unstable slopes where the potential for mass wasting adjacent to stream reaches is high. Therefore, increases in sediment delivery to streams due to mass wasting are unlikely to result from this action.

### Site Preparation

Post-treatment site preparation such as under-burning or soil surface “scarification” are not proposed. Pile burning may produce small patches of soil with altered surface properties that restrict infiltration. These surfaces are surrounded by large areas that would easily absorb any runoff or sediment that reach them. In addition, piles would be burned outside of riparian reserves and away from surface water or streams.

### Stream Temperature

Since most of the stream channels in the project area do not flow in the summer, increases in stream temperature as a result of this action are unlikely. Shading along perennial channels in the area (Yew Creek, Cabin Creek, Baxter Creek) is currently adequate and this proposal would not substantially alter stream side shading here.

### Channel Stability and Function

With one exception, this proposal is unlikely to alter the current condition of channels in the short term. The exception is the proposal to place trees from hillsides along Cabin Creek in the channel. A thorough field review of this proposal determined that risks to downstream resources, water quality and channel stability were low (see hydrology report in project file). At the same time, potential benefits include increased wood in the channel for improved channel function and aquatic habitat.

There are several reasons why the proposal is unlikely to alter channel conditions in the short term. Field review of channels in the project area found that they are functioning within the range expected for these stream types in the Oregon coast range. The minimization of potential disturbances from the proposed project is likely to result in the maintenance of project area stream channels in their current condition (i.e, functional). Additionally; 1) there would be no activities directly in channels, or on streambanks or flood plains, 2) stream flow and sediment delivery are unlikely to be altered, and 3) the supply of large wood in the channel and flood plain would not be altered.

Thinning in the Riparian Reserves carries little risk to water quality or channel function and provides potential benefits. Over the long term, reductions in stand density would likely increase

riparian forest health and tree size. This would lead to increased large wood recruitment for stream channels, an important factor in proper channel function. In addition, more open stands would allow for the growth of important riparian species in the understory, such as western red cedar, which are currently suppressed. Additional large wood in project area channels would ultimately slow stream velocity, increase retention of organic material, capture bedload, and improve aquatic habitat.

This proposal is unlikely to impede and/or prevent attainment of the stream flow and basin hydrology, channel function, or water quality objectives of the Aquatic Conservation Strategy. Over the long term this proposal should aid in meeting ACS objectives by speeding the development of older forest characteristics in the Riparian Reserves. (See Appendix A, ACS Objectives Review Summary)

## **Cumulative Effects**

### Streamflow

In almost all cases, removal of more than 20 percent of the vegetative cover over an entire watershed would result in increases in mean annual water yield (Bosch, et. al 1982). Removal of less than 20 percent of vegetative cover has resulted in slight changes where it was not possible to detect any effect (i.e., the error in measurements was greater than the change). Typically increases in stream flow occur during periods of low soil moisture and are attributed to reductions in evapotranspiration.

In addition to alterations in mean annual water yield, alterations in the timing and/or quantity of peak flow events as a result of forest harvest and road construction have been studied for several decades. Jones and Grant (1996) hypothesized that clear-cutting leads to increases in storm flow volume while road construction and wood removal from channels results in earlier, higher peak flows. Alterations in peak flow timing and quantity are particularly of concern in watersheds with potential for snow accumulation and quick melt-off during rain-on-snow events (ROS) such as occurred in the 1996 flood.

A "Preliminary" analysis of the risk for cumulative effects to hydrologic processes, channel conditions and water quality for the two watersheds (Ernest Creek and Yew Creek) was conducted utilizing the *Salem District Watershed Cumulative Effects Analysis Procedure, FY1994*.

### *Preliminary analysis results*

#### Ernest Creek

In summary, the analysis for Ernest Creek found a low sensitivity to increases in peak flows both for normal storm events and for severe events with a high likelihood of ROS. Water Available for Runoff (WAR) estimated no more than a 6 percent increase in peak flows above full forest cover. Predicted increases of less than 10 percent are considered to be within the range of method error.

Therefore, it was concluded that potential cumulative effects leading to increases in peak flows, under this proposal in conjunction with other likely actions in Ernest Creek during the next decade, are *low*.

#### Yew Creek

In summary, the analysis for Yew Creek found an “indeterminate” sensitivity to increases in peak flows. WAR estimated an 15.9 percent increase in an unusual two year peak flow above full forest cover. Therefore, it was concluded that potential cumulative effects leading to increases in peak flows, under this proposal in conjunction with other likely actions in Yew Creek during the next decade, cannot be ruled out. It was suggested that additional information be collected/analyzed in order to provide a more detailed assessment of the risks to the aquatic system (i.e., a Level 2 assessment). Additionally, the analysis stated that,

“The indeterminate rating does not require that the actions considered under this proposal be delayed or postponed. Rather, it points to the possibility of impacts to the aquatic ecosystem in the Yew Creek watershed *at some point during the ten year analysis period*. Furthermore, a WAR analysis that separated public from private actions in the watershed (see Appendix 3) found that the 10 percent threshold would be exceeded *without any forest management on public lands*. Forest management on public lands alone (i.e., private lands remain unharvested) is predicted to increase a two year event (unusual storm) from 592 cfs to 671 cfs; an increase of 13.4 percent over hypothetical full forest cover and 3.4 percent over current conditions. Therefore, even without any private harvest in the watershed it is possible that public actions alone would cause an increase above the 10 percent threshold. The increases predicted in this assessment remain below the 20 percent increase in a two year peak flow given as a threshold value for considering the effects of increased bed mobility and bed scour.”

A detailed analysis of both watersheds can be found in the project file, Hydrology Report.

Environmental consequences are described for the following alternatives only where they differ from Alternative 1.

#### **Alternative 2 (Reduced Acres)**

Under this alternative direct and indirect effects to water quality, hydrologic function and stream channel condition would be nearly identical to the previous alternative. The small reduction in acres treated slightly reduces the potential for these effects, but since they are already likely to be unmeasurable, there is no realistic way to evaluate the difference quantitatively. The cumulative effects analysis for risk of increases in peak flows would not be significantly different under this alternative.

### **Alternative 3 (No Yarding)**

This alternative would nearly eliminate any risks to water quality or channel condition that would result from road construction, yarding and hauling trees while retaining the benefits of improved stand condition. However, leaving large quantities of woody material on the forest floor increases the risk of fire and insect infestation. Under this scenario, the benefits obtained from thinning would be lost and increased sediment delivery to streams, reductions in wood supply over the long term and increased stream temperatures could be the result of this action. The cumulative effects analysis for risk of increases in peak flows would not be significantly different under this alternative.

### **Alternative 4 (No Action)**

No action would result in the continuation of current conditions and trends at this site.

## **Riparian: Affected Environment**

### Riparian Reserve Widths and Stream Influence Zones

Riparian Reserves in the proposed project would be 420 feet on each side of perennial fish-bearing streams and 210 feet on each side of intermittent and perennial non-fish bearing streams. These widths are in conformance with the *ROD* (p.10) and comprise approximately 114 acres of the proposed project (Table 7).

Although density management within the Riparian Reserves is appropriate, based on site specific analysis, watershed analysis and *LSRA* recommendations, the ID team and the Level 1 team determined that a slightly different prescription would be appropriate within approximately 200 feet of streams ("Stream Influence Zones", *SIZ*), which would be thinned to densities ranging from 50 to 98 trees per acre (average 67 trees per acre). These densities would allow for future recruitment of large wood in streams. Additionally, no treatments in Riparian Reserves are proposed unless stand densities and composition clearly indicate the need (see the *NFAWA* and *RRTU* for a discussion of criteria and treatment objectives). Hence, large areas of riparian vegetation were excluded from treatment under this proposal. Riparian Reserves outside the *SIZ* which were deemed appropriate for density management would be thinned to the same densities as those upland stands outside of Riparian Reserves.

Table 7: Total Acres of Upland, Riparian Reserves and *SIZ*

Total Upland Acres	176
Total Riparian Reserves Acres	114
Total <i>SIZ</i> Acres*	79

\* *SIZ* are a part of Riparian Reserves, therefore total acres in table do not add up the project area total.

### Stream Protection Zones

For the protection of stream channels and aquatic resources, buffers or “stream protection zones” were applied to all stream channels in the project area. These zones were determined in the field by BLM personnel following a protocol developed by the area hydrologist, biologists and riparian ecologist. This zone could be extended up slope, during field surveys, as far as deemed necessary to protect aquatic resources. This determination was based on site features such as floodplains, slope breaks, slope stability, water tables, etc.. See Appendix C for criteria used to identify stream protection zones.

### Stand Structure/Species Composition

There is no distinction in terms of stand structure or species composition between the upland and the portion of the Riparian Reserves which is proposed for density management. See Section III A for a discussion of stand structure/species composition.

### Large Woody Debris (LWD) in Streams

Wood in tributary channels in the project area was not measured. However, observations of wood quantities were made during field survey work for both the current project and previous projects in the area (i.e., the Running Bear timber sale). There are typically moderate to large amounts of wood (relative to other high gradient, intermittent channels in the Oregon mid-coast range) throughout the Yew Creek drainage. Much of this material remained after logging operations that occurred in the 1950s and 1960s when logging practices were typically “messy” (i.e., large quantities of wood considered of inferior quality were left behind). Recent additions of wood are predominately smaller sized deciduous species and occasional second growth conifer that has blown down or fallen over due to slope instability.

### Conifer Release Area along Cabin Creek

The riparian area in lower Cabin Creek is dominated by salmonberry and red alder with a scattering of younger conifer, mostly shaded western red cedar. A forty to fifty year old Douglas-fir stand extends more than 100 feet upslope on both sides. Recent additions of wood to the channel is almost exclusively deciduous with few to no Douglas-fir in the channel. It is likely that alder invaded after logging, as large conifer stumps are evident in the area.

## **Riparian: Environmental Consequences**

### **Alternative 1 (Proposed Action)**

Desirable habitat for aquatic and riparian dependant species within the SIZ would be enhanced in the following ways:

### Maintenance of stand health and stability

Stands grown under more open conditions are more stable than very dense stands. Individual trees experience more wind movement as they develop and as a result, produce more wood near the base, which strengthens the bole.

Trees with less competition maintain their live crowns longer, giving them a lower center of gravity and decreasing their height/diameter ratios. Live crown ratios (an index of tree vigor) less than 0.3 indicate a stand is no longer suitable for density management, as the trees would likely not respond to more open conditions, and are more subject to wind throw if the stand is opened up. Some researchers now suggest that wind firmness and individual tree stability are large factors in a tree reaching ages of 300 and over. Crown ratios of untreated stands, including the stream protection zones fall below 0.3 within 30 years. Stands within the SIZ treated to the proposed densities maintain crown ratios over 0.3 for an additional 30 years (see Tables 3A-3I).

### Short term increase of quality instream LWD

Immediately after the sale approximately 4 trees per 900 feet of stream (or 4 trees per acre) would be felled into streams from within the stream protection zones. These trees would be average stand diameter or larger and would represent the largest trees to fall into the stream for the next 30 years. This is because the vast majority of trees to die and fall in the short term would come from the SPZ where no other treatments are proposed and most LWD would be less than 12". Additionally, these felled trees are the only ones guaranteed to fall into the streams, with all others falling naturally in generally random directions.

### Long term increase of quality LWD recruitment

Within the SIZ, but outside the stream protection zones, trees smaller than stand average and at a consequently higher risk of mortality, would reach an average 20" DBH more quickly with thinning, compared to the no treatment option, creating natural opportunities for larger LWD recruitment. Thus, wood with a larger range of sizes would potentially be recruited into streams over the long term in treated stands. Smaller wood would continue to fall from within the stream protection zone where no treatment takes place, and larger wood would begin to be recruited from higher up the slopes as the treated stands reach heights of 200 feet. The volume of wood reaching streams as LWD would average 36 percent higher in treated stands (Table 8A-8H).

Table 8A:UNIT 1

Treatment	Age	Cum. Mort > 12" <sup>1</sup>	Mort Avg. DBH <sup>2</sup>	Mort BA (mbf)
Current Stand	47			
No Treat	77	25	14.0	5.8

Treatment	Age	Cum. Mort > 12" <sup>1</sup>	Mort Avg. DBH <sup>2</sup>	Mort BA (mbf)
	122			
Cut 7-14" (SIZ)	47			
	77	22	14.9	6.3
	122			

All notes can be found at the bottom of Table 8H

Table 8B: UNIT 2

Treatment	Age	Cum. Mort > 12" <sup>1</sup>	Mort Avg DBH <sup>2</sup>	Mort BA (mbf)
Current Stand	55			
	85	6	13.6	1.1
	130			
Cut 7-15" (SIZ)	55			
	85	8	16.3	3.6
	130			

Table 8C: UNIT 4

Treatment	Age	Cum. Mort > 12" <sup>1</sup>	Mort Avg DBH <sup>2</sup>	Mort BA (mbf)
Current Stand	55			
	85	3	14.0	0.9
	130			
Cut 7-18" (SIZ)	55			
	85	6	17.2	3.4
	130			

Table 8D: UNIT 5

Treatment	Age	Cum. Mort > 12" <sup>1</sup>	Mort Avg DBH <sup>2</sup>	Mort BA (mbf)
Current Stand	53			
	83	2	14.6	0.3
	128			
Cut 7-18" (SIZ)	53			
	83	6	20.9	3.5
	128			

Table 8E: UNIT 6

Treatment	Age	Cum. Mort > 12" <sup>1</sup>	Mort Avg DBH <sup>2</sup>	Mort BA (mbf)
Current Stand	47			
	77	5	14.0	0.9
	122			
Cut 7-14 (Upland and SIZ)	47			
	77	7	14.2	1.1
	122			

Table 8F: UNIT 7

Treatment	Age	Cum. Mort > 12" <sup>1</sup>	Mort Avg DBH <sup>2</sup>	Mort BA (mbf)
Current Stand	48			
	78	11	14.5	2.3

Treatment	Age	Cum. Mort > 12" <sup>1</sup>	Mort Avg DBH <sup>2</sup>	Mort BA (mbf)
	123			
Cut 7-14" (SIZ)	48			
	78	11	14.9	2.4
	123			

Table 8G: UNIT 8

Treatment <sup>1</sup>	Age	Cum Mort > 12" <sup>1</sup>	Mort Avg DBH <sup>2</sup>	Mort BA (mbf)
Current Stand	48			
	78	11	14.5	2.3
	123			
Cut 7-14" (Upland & SIZ)	48			
	78	11	14.9	2.4
	123			

Table 8H: UNIT 9

Treatment	Age	Cum. Mort > 12" <sup>1</sup>	Mort Avg DBH <sup>2</sup>	Mort BA (mbf)
Current Stand	52			
	82	5	14.2	1.2
	127			
Cut 7-15" (SIZ)	52			
	82	8	14.9	1.6

Treatment	Age	Cum. Mort > 12" <sup>1</sup>	Mort Avg DBH <sup>2</sup>	Mort BA (mbf)
	127			

1. Includes 4 trees per acre felled into or adjacent to streams after sale
2. Includes only logs 12" DBH and larger

### Larger trees near streams

Trees in the stream protection zone would remain in dense conifer stands and therefore these stands would not attain old growth structural characteristics nor would most individual trees attain desirable characteristics (deep crowns, large limbs, large diameters) favored by many bird and bat species who frequent stream areas. However, a few trees would be released when the 4 trees per acre are felled into streams after the proposed sale. These trees would remain stable, maintain growth over the long term, develop desirable characteristics, and ultimately may provide the very large wood delivered through a debris flow into a fish bearing stream.

### Conifer Release along Cabin Creek

Hardwoods competing for light with existing conifers would be removed, which would allow for an increase in available sunlight to reach conifers identified for release. In time, the conifers should become dominant in the areas that are treated. Only those hardwoods competing with conifers would be cut, and they would be left as down wood.

Retreatment may be necessary in the future if alder crowns close in again before the treated conifers attain dominance. Red alders larger than four inches in diameter normally do not resprout after cutting, but crowns of uncut alders tend to close at approximately 8 percent per year (Chan, 1996).

Environmental consequences are described for the following alternatives only where they differ from Alternative 1.

#### **Alternative 2 (Reduced Acres)**

Alternative 2 would decrease the proposed project area. All density management prescriptions would remain the same and environmental consequences would not change from alternative 1.

#### **Alternative 3 (No Yarding)**

Maintenance of stand health and stability, increase in short and long term increase of quality instream LWD, increase in size and quality of selected stream adjacent trees would be achieved as

outlined in alternative 1, above. Near stream stands would be at approximately the same risk for increased fire risk and increased risk of bark beetle infestation as outlined in the Vegetation Environmental Consequences, above.

#### **Alternative 4 (No Action)**

Environmental Consequences would be the same as outlined for Alternative 4 in the Vegetation section. In addition, there would be a short term and long term decrease of quality instream LWD and high quality released stream adjacent trees.

### **G. Fisheries**

Effects on fisheries and their habitats

#### **Fisheries: Affected Environment**

Four major tributary streams flow through and adjacent to the proposed project area into Crooked Creek (see Map 1). Crooked Creek is a Tributary to the North Fork Alsea River, part of the Upper Alsea 5<sup>th</sup> field watershed. The main tributaries in the project area are: Yew Creek, Cabin Creek, Zahn Creek, and Baxter Creek.

Baxter Creek runs along the western edge of unit 7, with a small 2<sup>nd</sup> order tributary that runs into the unit. This small tributary provides habitat for resident cutthroat (*Oncorhynchus clarkii*). The mainstem of Baxter creek provides habitat for Steelhead trout (*Oncorhynchus mykiss*), Coho Salmon (*Oncorhynchus kisutch*) and Cutthroat trout.

Cabin Creek and Yew creek provide habitat for Steelhead trout, Coho Salmon and Cutthroat trout. Anadromous fish likely only use the lower portion of Cabin creek due to gradient and smaller stream size; in Yew Creek anadromous fish can access habitat to the southern edge of section 4 (NFAWA).

Zahn Creek provides habitat for Cutthroat Trout, but only the headwaters of Zahn Creek is within the project area and does not contain fish. Another small unnamed tributary runs between unit 1 and unit 2. This stream does not contain fish.

All of these streams contain typical coast range stream habitats and increase in gradient fairly quickly limiting the extent of anadromous fish use. Only Yew Creek provides habitat for anadromous fish approximately 1 1/4 mile. Baxter Creek provides habitat for anadromous fish for approximately one mile (professional judgement).

#### **Cabin Creek Instream Wood Placement**

There are currently high to moderate levels of large wood, particularly higher in the reach, but additional wood could be quite helpful lower in the reach.

There is a clear difference in morphology/habitat at 1,000 feet above the culvert with a cascade (six foot drop and a small pool at the bottom) that may be blocking passage of salmonids. Above this point there are currently five jams, 34 pieces of cedar and 22 pieces of deciduous wood in the channel. There were a total of 145 pieces/mile of wood greater than 24 inches in diameter and longer than 1.5 times channel width indicating a “functional” channel in regard to the quantity of wood. A number of pools were observed with cover and plenty of gravel substrate in this section suggesting that the condition of aquatic habitat is good, however, it is likely that salmonids do not access this reach. Most of the large wood is heavily decayed cedar left in the channel since the unit was logged. Most of the recent additions of wood are smaller deciduous trees blown down over the channel indicating that the trend for large wood recruitment in this channel is probably downward.

The lower 1,000 foot reach has a sharp decline in wood: 17 pieces of cedar, 5 pieces of deciduous wood and two small jams. Currently there are 12 pieces of wood greater than 24 inches and longer than 1.5 times channel width for a total of 63 pieces/mile. This puts the reach in a zone between functional and non-functional with the trend clearly downward since recent recruitment is low. Once again, most of the larger pieces were heavily decayed cedar left in the channel since the unit was logged and virtually all of the recent wood is smaller deciduous. Habitat conditions in this reach are also poor: bedrock channel with few pools and little cover, low amounts of gravel and substrate.

There are no structures at risk near the junction of Cabin Creek and Highway 34 either on aerial photos or in the field. The primary risk at this location would be a debris torrent entering the highway which, at least potentially, could cause a serious accident. An old road that crosses Cabin Creek on Starker Forest land, with its associated culvert and fill, would be more than adequate for halting any debris torrent that would likely reach this portion of the channel. This road crosses Cabin Creek approximately 150 feet west of Highway 34. It is easily accessible from Highway 34 behind a locked gate. The base of the road is approximately 12 feet above the current channel bed on the upstream side. The channel upstream is moderate gradient (2-3 percent) with a fairly wide flood plain (approximately 50 feet); most debris torrents would not have the energy in this setting to overtop the road. In addition, between the channel at the outlet of the culvert and the highway lies another large embankment (possibly constructed along with the highway), 15-20 feet above the channel bed. It is approximately 100 feet wide, stable and covered with deciduous and conifer trees. It is highly unlikely any debris torrent large enough to overtop this embankment and reach the highway would ever be generated in Cabin Creek.

There is a 48 inch culvert (currently functional although it is 50 percent blocked at the entrance) at the old road crossing on Cabin Creek. There is a fair chance the culvert would block completely in the next few years if it isn't repaired, but the blockage was reported to the land owner and has likely been removed. However, if blockage were ever to occur, it is unlikely the resulting flood release would deposit on the highway. The creek below the culvert does not have a straight path to the highway but follows a sharp curve to the south enforced by the large embankment on its eastern side. Gradients are moderate and there is a fifty foot flood plain. These features would likely

dissipate much of the energy of a flood release at this location. Where Cabin Creek crosses the highway there is a concrete culvert, in good condition, and the bed of the creek is approximately 12 feet below the base of the highway. Due to the sharp angle where the stream enters the culvert at this location, it is likely a second debris dam would form here.

## **Fisheries: Environmental Consequences**

### **Alternative 1 (Proposed Action)**

The proposed action would have no measurable adverse impacts to local or anadromous fish and fish habitat. Habitat and channel conditions are expected to be maintained. Impacts may occur due to small inputs of sediment, but would be short term (a year or less). Skyline and aerial yarding in sloped areas (for lift), the small amount and size of timber yarded in conjunction with stream protection zones and seasonal restrictions (see design features) would keep sediment to a minimal level.

All road work would be seasonally restricted and hauling would be closely monitored and mitigated to avoid water quality degradation (see design features).

A net loss in roads would be obtained due to decommissioning. This would most likely result in a very short term increase in turbidity, but would return streams impacted by this action to natural hydrologic function.

New roads being built are all on ridge tops and would not affect the aquatic environment. Thinning within the Riparian Reserves would enhance stand conditions, growing trees faster than if the stand were to grow naturally. This would increase the potential for high quality large woody debris.

### **Cabin Creek Instream Wood Placement**

The potential for a debris torrent to move through the BLM section of lower Cabin Creek, pick up wood in the channel and move it downstream where it could pose a risk to the highway or public safety is low. While debris torrents and landslides are clearly a feature in Cabin Creek (as in most coast watersheds) the vast majority of wood and debris from the headwaters of Cabin Creek never gets very far downstream from a point approximately 1,000 feet above Highway 34.

The Cabin Creek channel above the culvert follows a contact between Tyee sandstone below and the overlying Siletz basalts. For approximately 750 feet upstream from the culvert the channel is 2-3 percent gradient on bedrock sandstone with approximately a 50 foot flood plain. This reach is not steep enough to provide much energy for pushing a debris torrent on and has a flood plain which would dissipate and disperse a flood wave.

Approximately 1,000 feet upstream from the culvert the channel transitions to the Siletz formation.

There is an approximately 200 foot zone of higher gradient (5-10 percent), cascading channel on basalt bedrock. This zone formed in response to the change in bedrock. Associated with this zone are slump prone hill-slopes to the north and south which have constricted the valley. Two tributaries also reach the main channel at right angles in this zone. The sharp angle of entry and drop in gradient has resulted in a large buildup of debris, wood and soil, in this zone.

Upstream a large “flat” has formed with low gradient streams (2-4 percent) meandering through a moderately confined valley. This area is the depository for most of the material moving from higher gradient channels and hillslopes in Cabin Creek. Below this area wood supply in the channel drops and there is little evidence of large floods or debris dams. Placing additional conifers in this reach, particularly larger pieces, would likely be of benefit by trapping more substrate, and providing cover and scouring pools.

Short term impacts to local streams of sediment delivery due to riparian thinning, yarding, timber hauling, road work and other timber sale related activities are likely to occur. However, these small inputs of sediment are **not likely to adversely affect** local fish populations or their stream habitat.

#### Essential Fish Habitat Determination

The proposed project is **unlikely to affect** Essential Fish Habitat for chinook or coho salmon in the Alsea for the reasons listed above.

Environmental consequences are described for the following alternatives only where they differ from Alternative 1.

#### **Alternative 2 (Reduced Acres)**

In Alternative 2 the net yarded acres would decrease, but road and landing construction would remain essentially the same. Density management prescriptions would remain unchanged and the same quantities of large wood would be added to the streams. Environmental consequences and therefore the effects on fish would not significantly change from Alternative 1.

#### **Alternative 3 (No Yarding)**

There would be no yarding, road building or hauling and therefore no short term increase in sedimentation or stream turbidity. There would be no instream wood placement in Cabin Creek.

#### **Alternative 4 (No Action)**

Conditions would remain as they are at present. No large wood would be added to the streams in the short term and potential for long term recruitment of large wood would decrease.

## **H. Visual Resources**

Issue: Effects on Visual Resource Management (VRM) Class II and Class III visual resources

### **Visual Resources: Affected Environment**

Portions of Units 1, 2, 3 and 9 face Highway 34 and are in VRM Class II (retaining the existing characteristics of the landscape is required) and VRM Class III (partially retaining the existing characteristics of the landscape is required).

### **Visual Resources: Environmental Consequences**

#### **Alternative 1 (Proposed Action)**

Although Units 1,2,3 and 9 face the highway, they are difficult to see from there, due to the steep slope on the west side of the highway and the scenic buffer of trees that have been left. At best, a fringe of trees at the top of the hill is all that is visible of BLM land. Thinning would not affect the scenic quality of the landscape.

#### **Alternative 2 (Reduced Acres)**

Acreages and design features remain the same as Alternative 1 for Units 1, 2, 3, and 9.

#### **Alternative 3 (No Yarding)**

Under Alternative 3, trees would be thinned but yarded. Therefore, visual resources would remain the same as for Alternative 1.

#### **Alternative 4 (No Action)**

Visual resources would remain unaltered.

## **IV. MONITORING**

As a requirement of the Salem District *RMP*, yearly efforts are made to monitor the implementation of the various projects by selecting a representative sample of each project type conducted in conformance with the *RMP*. Data gathered by timber sale contract administration and by monitoring implementation of terms and conditions related to the pertinent Biological Opinion would serve as the basis for such monitoring. This proposed project may or may not be selected for plan conformance monitoring.

Five monitoring items have been designed as part of the adaptive management process to gather supplemental information that would assist in future project development within LSR and Riparian

Reserve land-use allocations. The first four of the following items would be required for full implementation of the proposed action, while the last two would be implemented dependent on available time and funding. Monitoring items designed for this project are described in more detail in Appendix G and include:

- Post-harvest assessment of CWD accumulations from harvest activities, windthrow, and prescriptive treatments.
- Assessment of instream large woody debris accumulations from post-harvest instream placement project.
- Post-harvest assessment of appropriate tree planting locations.
- Post-harvest assessment of logging slash and hazardous fuels build-up.
- Pre- and Post-harvest sample plots of stand conditions in both LSR and Riparian Reserve allocations (follow-up of stand exam data and photo plots).

Monitoring would be accomplished through timber sale administration and in accordance with monitoring guidelines in the *RMP*, Appendix J. Additional monitoring would occur as outlined in Appendix G.

## **V. CONSULTATION**

In addition to the interdisciplinary team that developed and reviewed this proposed action, the following agencies or individuals have or will provide input:

U.S. Fish and Wildlife Service, Regional Office, Portland  
National Marine Fisheries Service

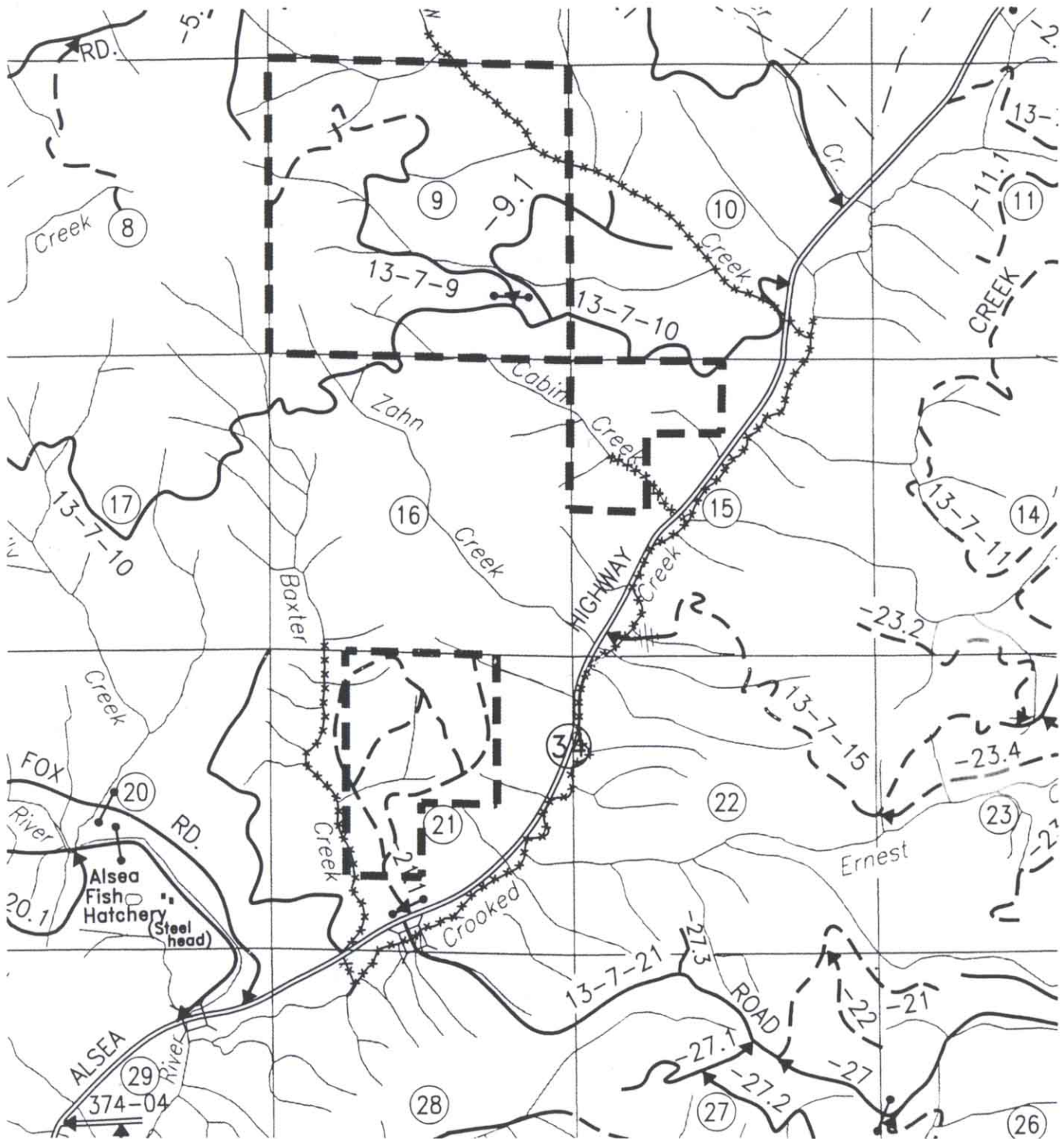
## VI. INTERDISCIPLINARY TEAM MEMBERS

NAME	TITLE	DATE/INITIAL
Amy Haynes	Team Lead, Ecologist	ah / 12/10/01
Gary Humbard	Logging System Specialist	12/10/01 GLH
Scott Hopkins	Wildlife Biologist	SH 12-13-2001
Tom Tomczyk	Soil Scientist/Fuels Specialist	TST 12/10/01
Diane Morris	Silviculturist	12/10/2001 DML
Ron Exeter	Botanist	Dec 10, 2001 RE
Tom Vanderhoof	Cultural Specialist	Dec. 10, 2001 TMV
Steve Liebhardt	Fisheries Biologist	SL 12/10/01
Patrick Hawe	Hydrologist	PH 12/11/01
Steve Cyrus	Civil Engineering technician	A.B.C. 12/11/01
Belle Smith	NEPA Coordinator	B.S. 12-13-2001
Randy Gould	Natural Resource Staff Administrator (Management review)	RG 12/13/01

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T. 13 S., R. 7 W., Sections 9, 15 & 21 W.M. - SALEM DISTRICT - OREGON

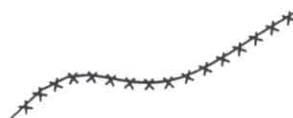
Klickitat Tie  
Project Location Map



Scale: 1" = 2640'



Project location



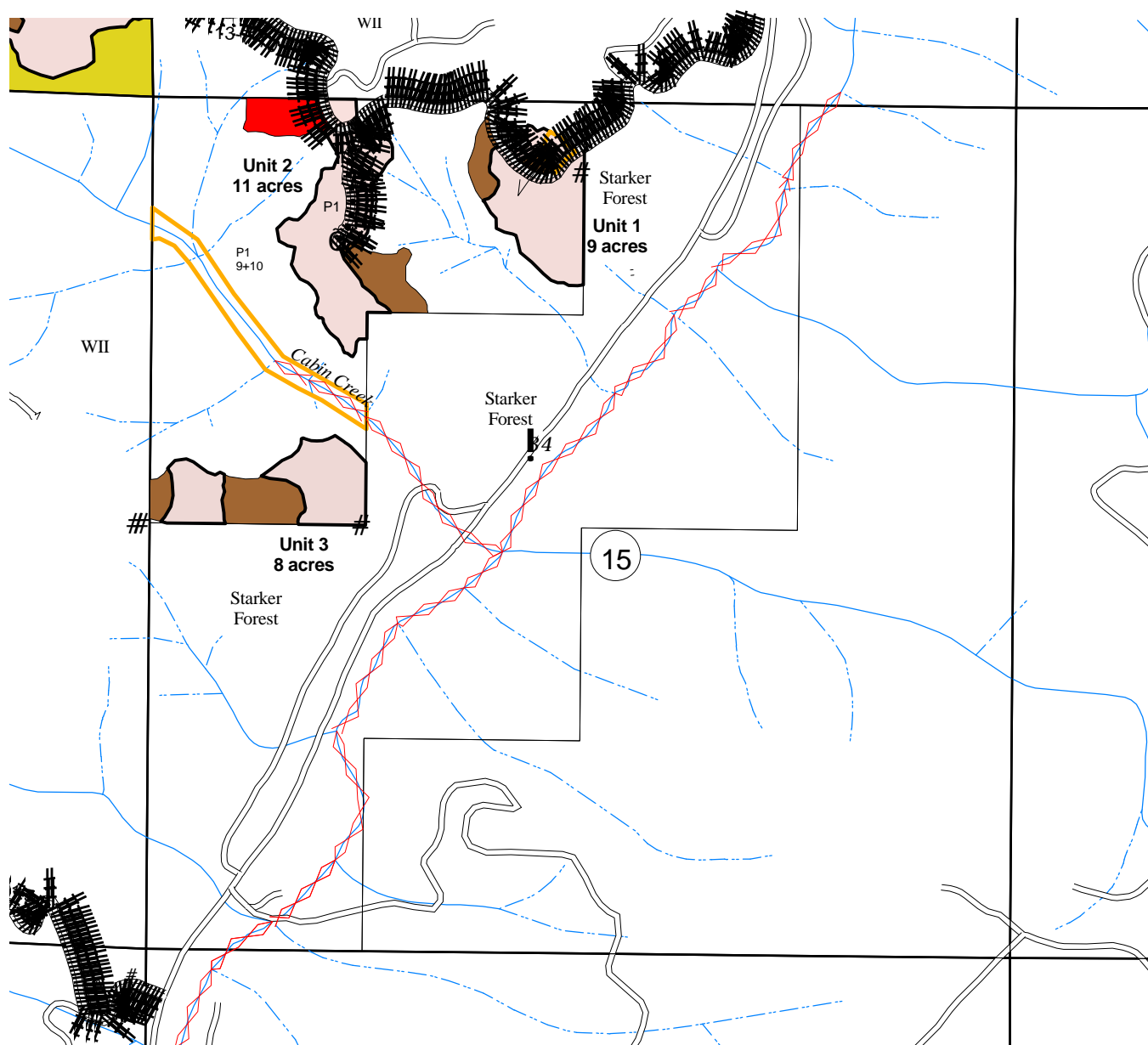
Coho present

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Sheet 1 of 3

# KLICKITAT TIE EA MAP - Alternative 1

T. 13 S., R. 7 W., Section 15, W. M. - SALEM DISTRICT - OREGON



## LEGEND

Scale: 1" = 1,000'



Y Helicopter landing

Ø Service landing

Ø Landing

— Fishbearing Streams

- - - Non-Fishbearing Streams

◇ Coho presence

— Existing Road

— Overgrown or Impassable Road

— New Construction

— Reconstruction

— Winter haul route

□ Conifer release area

■ Fungus Protection Area

■ Red Tree Vole Protection Area

○ Aerial yarding

○ Ground based yarding

○ Skyline yarding

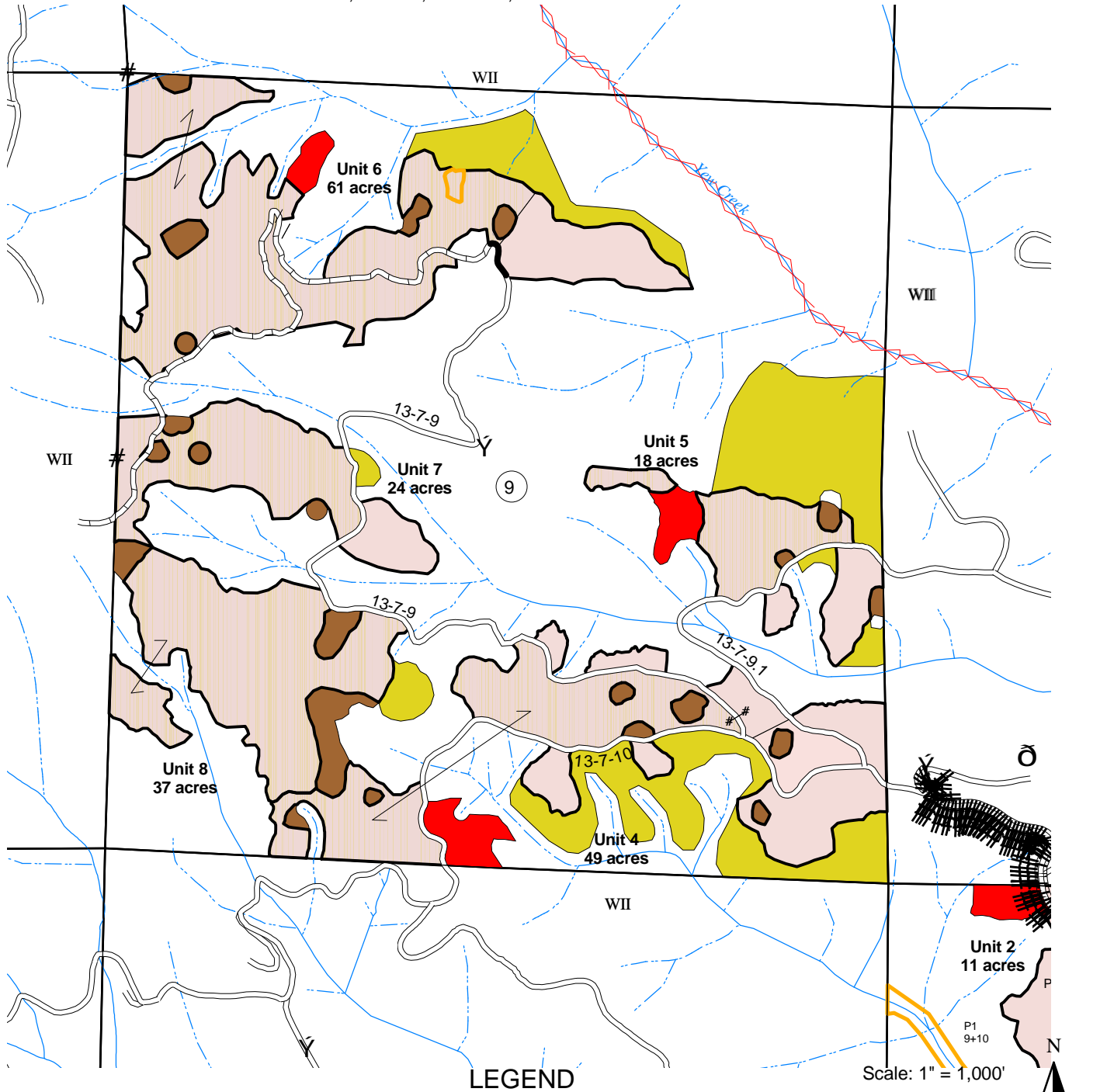
■ CWD treatment outside the sale area

# Corner found

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**KLICKITAT EA MAP - Alternative 1**

T. 13 S., R. 7 W., Section 9, W. M. - SALEM DISTRICT - OREGON



Y Helicopter landing

O Service landing

O Landing

— Fishbearing Streams

- - - Non-Fishbearing Streams

X Coho presence

— Existing Road

- - - Overgrown or Impassable Road

- - - New Construction

- - - Reconstruction

- - - Winter haul route

□ Conifer release area

■ Fungus Protection Area

■ Red Tree Vole Protection Area

○ Aerial yarding

○ Ground based yarding

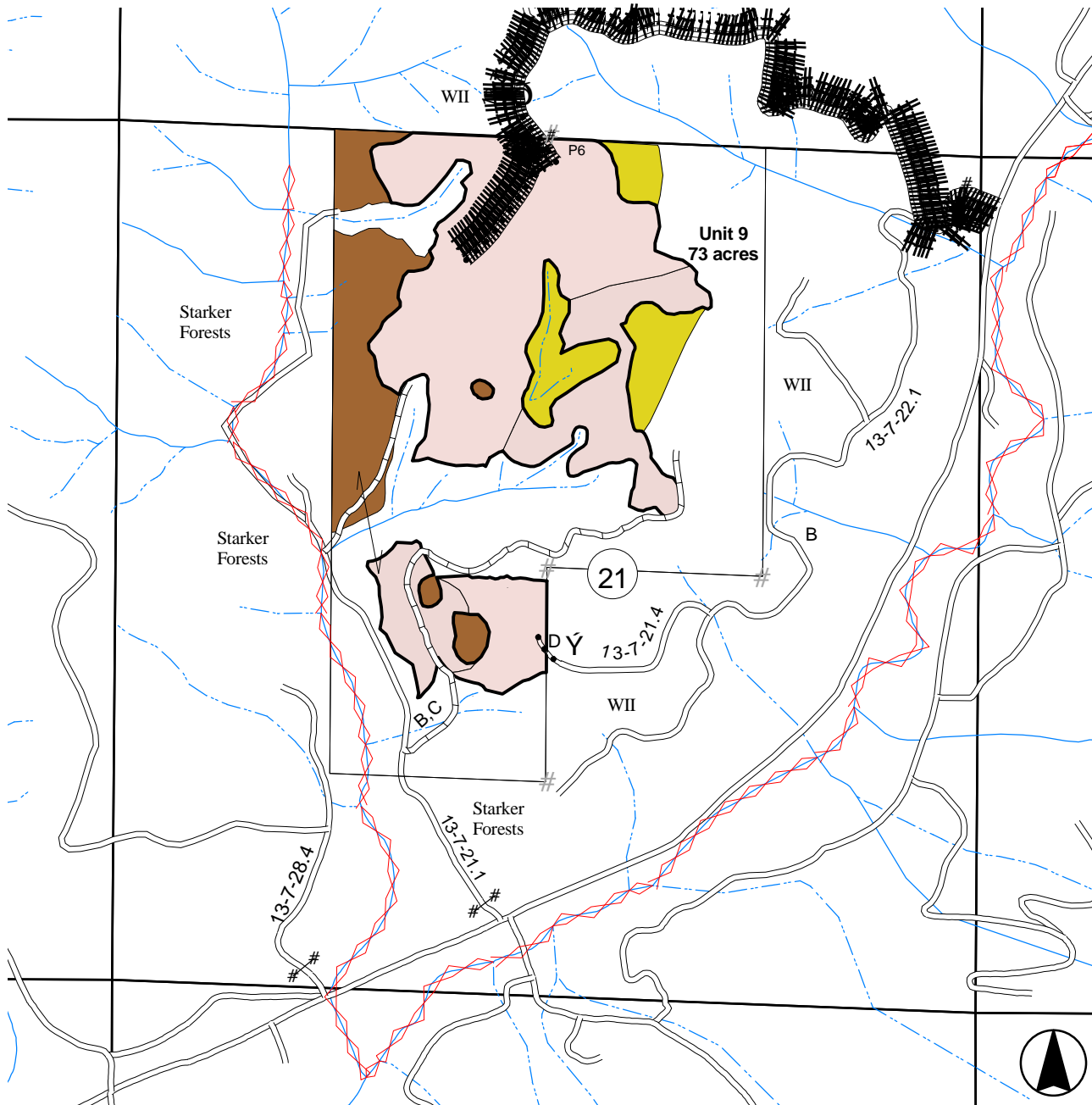
○ Skyline yarding

■ CWD treatment outside the sale area

# Corner found

**KLICKITAT TIE EA MAP - Alternative 1**

T. 13 S., R. 7 W., Section 21, W. M. - SALEM DISTRICT - OREGON

**LEGEND**

Scale: 1" = 1,000'

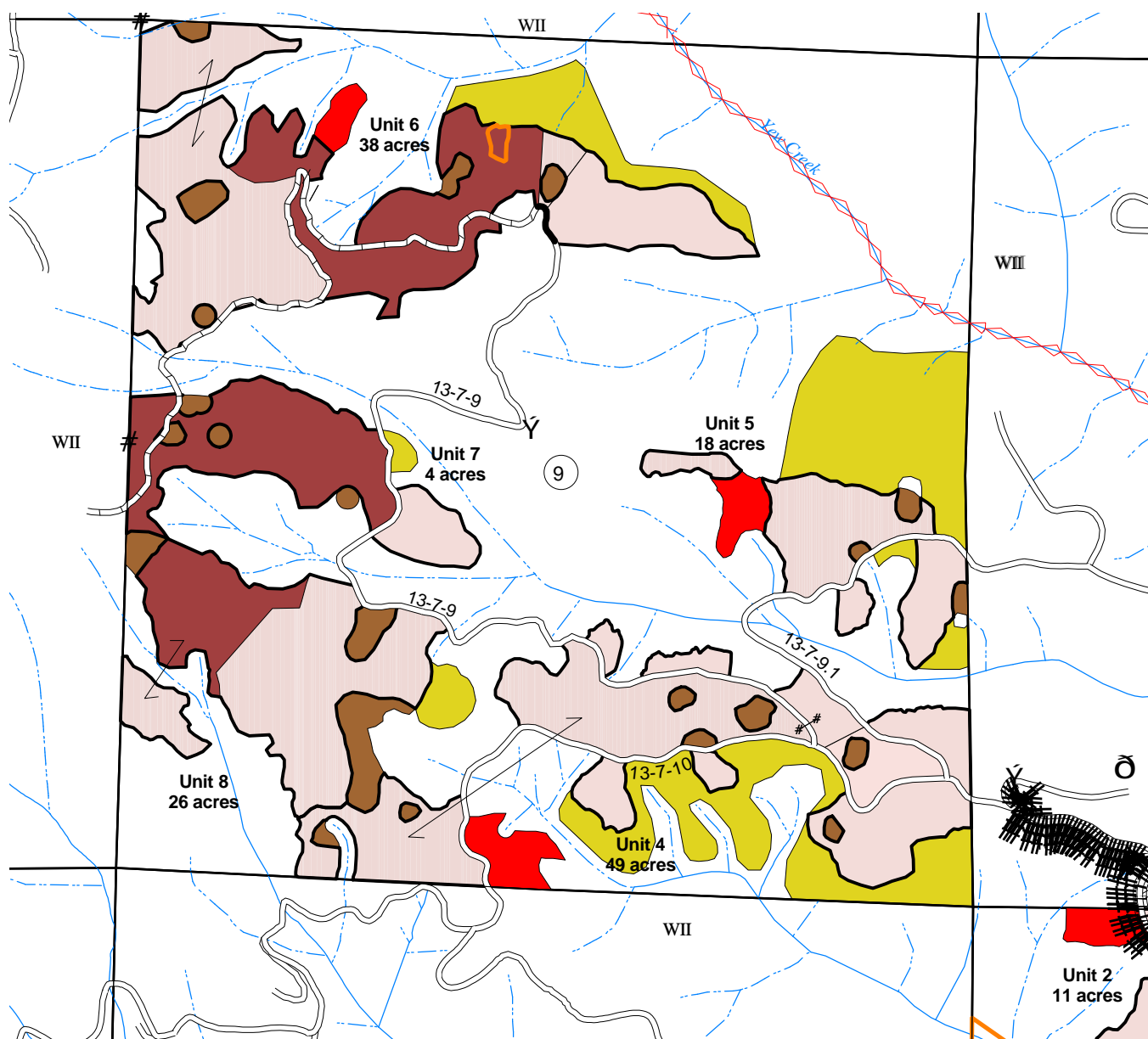
Y	Helicopter landing	—	Existing Road	○	Aerial yarding
Ø	Service landing	- - -	Overgrown or Impassable Road	○	Ground based yarding
Ø	Landing	· · ·	New Construction	○	Skylight yarding
—	Fishbearing Streams		Reconstruction	■	CWD treatment outside the sale area
- - -	Non-Fishbearing Streams		Winter haul route	#	Corner found
◇	Coho presence	□	Conifer release area		
		●	Fungus Protection Area		
		●	Red Tree Vole Protection Area		

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Sheet 2 of 3

# KLICKITAT EA MAP - Alternative 2

T. 13 S., R. 7 W., Section 9, W. M. - SALEM DISTRICT - OREGON



## LEGEND

Scale: 1" = 1,000'

Y Helicopter landing

O Service landing

O Landing

— Fishbearing Streams

- - - Non-Fishbearing Streams

◇ Coho presence

— Existing Road

- - - Overgrown or Impassable Road

- - - New Construction

Reconstruction

Winter haul route

□ Conifer release area

● Fungus Protection Area

● Red Tree Vole Protection Area

● Aerial yarding

● Ground based yarding

● Skyline yarding

● Deferred

● CWD treatment outside the sale area

# Corner found



## APPENDIX A: Aquatic Conservation Strategy Objectives Review Summary

(Note - See RMP pg 5-6 for more detailed explanations of the ACS objectives)

ACS Objective	How Project Meets the ACS Objective
<p>1. Maintain and restore distribution, diversity, and complexity of watershed and landscape features to ensure protection of aquatic systems.</p>	<p>The largest seral stage in the North Fork Alsea watershed is in conifer stands less than 80 years old. These stands account for 58 percent of the Riparian Reserves in the watershed. Most of them were logged and planted or allowed to seed in, and are generally uniform, even-aged Douglas-fir stands. (<i>North Fork Alsea and South Fork Alsea Watershed Analyses Riparian Reserve Treatment Recommendations Update, RRTRU, May 2000, p.3</i>). Generally the watershed lacks large instream woody debris (<i>NFAWA</i>, p. 74) and lacks snags, CWD, sub-canopy layers and species diversity (<i>NFAWA</i>, p. 89)</p> <p>The proposed density management in the Riparian Reserves would be a means to enhance late-successional forest conditions and speed up attainment of these conditions across the landscape. Since Riparian Reserves provide travel corridors and resources for aquatic, riparian dependant and other riparian and/or late-successional associated plants and animals, the increased structural and plant diversity would ensure protection of aquatic systems by maintaining and restoring the distribution, diversity and complexity of watershed and landscape features..</p>
<p>2. Maintain and restore spatial connectivity within and between watersheds.</p>	<p>Long term connectivity of terrestrial watershed features would be improved by enhancing conditions for understory development (structural diversity), increasing the proportion of minor species in the stand (species diversity), increasing growth rates on remaining trees and creating fresh snags and down wood. In time, the Riparian Reserves would improve in functioning as refugia for late-successional, aquatic and riparian associated and dependent species. In the short term, the fresh snags and down wood created by the project would begin to mitigate the lack of snags and down wood in the watershed.</p> <p>Aquatic connectivity would be enhanced by the immediate addition of 4 conifers per acre to and adjacent to streams in the project area. No barriers to aquatic connectivity would be created within the project area.</p> <p>Both terrestrial and aquatic connectivity would be maintained, and over the long-term, as Riparian Reserves develop late successional characteristics, lateral, longitudinal and drainage connectivity would be restored.</p>

<p>3. Maintain and restore physical integrity of the aquatic system, including shorelines, banks, and bottom configurations.</p>	<p>A stream protection zone would be established along all streams and identified wet areas within the harvest area to maintain the integrity of shorelines, banks and bottom configurations. Criteria used to designate stream protection zones are riparian vegetation, significant slope breaks, active floodplain or high water tables, and areas contributing to stream shading. All buffers are a minimum of 50 feet. No cutting or yarding would be permitted in or through the stream protection zones during the sale, and where a cut tree does fall within one, the portion of the tree within the stream protection zone would remain in place. (EA, p.15 and Appendix C)</p> <p>There are several reasons why the proposal is unlikely to alter channel conditions in the short term. Field review of channels in the project area found that they are functioning within the range expected for these stream types in the Oregon coast range. The minimization of potential disturbances from the proposed project is likely to result in the maintenance of project area stream channels in their current condition (i.e, functional). Additionally; 1) with the exception of adding large wood to streams which would improve channel function and aquatic habitat, there would be no activities directly in channels, or on streambanks or flood plains, 2) stream flow and sediment delivery are unlikely to be altered, and 3) the supply of large wood in the channel and flood plain would not be altered.</p> <p>Thinning in the Riparian Reserves carries little risk to water quality or channel function and provides potential benefits. Over the long term, reductions in stand density would likely increase riparian forest health and tree size. This would lead to increased large wood recruitment for stream channels, an important factor in proper channel function. In addition, more open stands would allow for the growth of important riparian species in the under-story, such as western red cedar, which are currently suppressed. Additional large wood in project area channels would ultimately slow stream velocity, increase retention of organic material, capture bedload, and improve aquatic habitat.</p> <p>This proposal is unlikely to impede and/or prevent attainment of the stream flow and basin hydrology, channel function, or water quality objectives of the Aquatic Conservation Strategy. Over the long term this proposal should aid in meeting ACS objectives by speeding the development of older forest characteristics in the Riparian Reserves. (EA p. 50)</p> <p>Management activity throughout the project area is not likely to cause any alteration in water flows that could affect channel morphology.</p>
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<p>4. Maintain and restore water quality necessary to support healthy riparian, aquatic, and wetland ecosystems.</p>	<p>This proposal is unlikely to impede and/or prevent attainment of the stream flow and basin hydrology, channel function, or water quality objectives of the Aquatic Conservation Strategy. Over the long term this proposal should aid in meeting ACS objectives by speeding the development of older forest characteristics in the Riparian Reserves.</p> <p><u>Stream Temperature:</u> Since most of the stream channels in the project area do not flow in the summer increases in stream temperature as a result of this action are unlikely. Shading along perennial channels in the area (Yew Creek, Cabin Creek, Baxter Creek) is currently adequate and this proposal would not substantially alter stream side shading here (EA p. 49).</p> <p><u>Sediment delivery and turbidity:</u> See no.5 below</p>
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<p>5. Maintain and restore the sediment regime under which system evolved.</p>	<p>For the protection of stream channels and aquatic resources, stream protection zones were applied to all stream channels in the project area. These zones were determined in the field by BLM personnel following a protocol developed by the area hydrologist, biologists and riparian ecologist. Hence, large areas of riparian vegetation were excluded from treatment under this proposal. (EA, p. 17, 52, Appendix C)</p> <p>All the proposed road construction and reconstruction locations have been reviewed in the field for potential effects to water quality. All construction is limited to moderate to low gradient sites (&lt;10 percent) outside of riparian reserves. The risk of impacts to water quality due to road construction would be limited by restricting work to periods of low rainfall and runoff. Construction would employ techniques to reduce concentration of runoff and sediment to a minimum, such as water-bars on steeper sections of road and, since no additional stream crossings would be constructed, there would be little opportunity for sediment from these surfaces to enter streams.</p> <p>The haul routes would be short sections of rocked forest roads to Highway 34, a paved surface. Timber hauling during periods when water is flowing on roads and into ditches could increase stream turbidity if flows from ditches are large enough to enter streams. To limit the risk of fine sediment entry into local streams, most hauling would be restricted to periods of low soil moisture. All season hauling would be restricted to two road systems and measures would be taken to prevent sedimentation in streams (see Design Features).</p> <p>Cable yarding corridors, if sufficiently compacted, may route surface water and sediment into streams. However, several factors limit the potential for this to occur: 1) even if compacted, high levels of residual slash on yarding corridors would contribute to reducing the accumulation of runoff by deflecting and redistributing overland flow laterally to areas where it will infiltrate into the soil, 2) stream protection zones in Riparian Reserves have high surface roughness which functions to trap any overland flow and sediment before reaching streams, 3) the small size of trees being yarded would limit surface disturbance to minimal levels, and 4) helicopter yarding over much of the area would cause only minimal surface disturbance and limits the extent of yarding corridors.</p> <p>Tree removal is not proposed on steep, unstable slopes where the potential for mass wasting adjacent to stream reaches is high. Therefore, increases in sediment delivery to streams due to mass wasting are unlikely to result from this action.</p> <p>Post treatment site preparation such as under-burning or soil surface “scarification,” are not proposed. Pile burning may produce small patches of soil with altered surface properties that restrict infiltration. These surfaces are and away from surface water or streams (EA, p. 42-43).</p>
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<p>6. Maintain and restore instream flows.</p>	<p>Alterations in the capture, infiltration and routing (both surface and subsurface) of precipitation may occur as a consequence of the mechanical removal of trees and reductions in stand density. This effect would be difficult to measure and unlikely to substantially alter stream flow or water quality. Any changes in the capture and routing of precipitation would likely return to pre-treatment conditions as the remaining forest fills out. Increases in mass wasting and alterations in sediment regime as a result of this action are of low probability. (EA p. 48)</p> <p>Additional large wood in project area channels would ultimately slow stream velocity, increase retention of organic material, capture bedload, and improve aquatic habitat. (EA p. 50)</p>
<p>7. Maintain and restore the timing, variability and duration of floodplain inundation and water table elevation in meadows and wetlands.</p>	<p>The proposed thinning would not alter existing patterns of floodplain inundation or water table elevation as it would have no effects or only negligible short-term negative effects on existing flow patterns and stream channel conditions.</p> <p>Alterations in the capture, infiltration and routing (both surface and subsurface) of precipitation, as a consequence of the mechanical removal of trees and reductions in stand density, has been documented on watersheds in the Pacific Northwest and other parts of the world. However, the actions reviewed under this proposal would affect less than 1 percent of the forest cover in the three watersheds. Therefore, detectable direct or indirect effects to streamflow as a result of this action are unlikely (Bosch, et. al 1982). (EA, p. 48-50; and EA, pp. 50-52 for Cumulative Effects discussion).</p>

<p>8. Maintain and restore the species composition and structural diversity of plant communities in riparian zones and wetlands to provide thermal regulation, nutrient filtering, and appropriate rates of bank erosion, channel migration and CWD accumulations.</p>	<p>For the protection of stream channels and aquatic resources, buffers or “stream protection zones” were applied to all stream channels in the project area. These zones were determined in the field by BLM personnel following a protocol developed by the area hydrologist, biologists and riparian ecologist. This zone could be extended up slope, during field surveys, as far as deemed necessary to protect aquatic resources. This determination was based on site features such as floodplains, slope breaks, slope stability, water tables, etc.. Additionally, no treatments in riparian areas are proposed unless stand densities and composition clearly indicate the need (see the <i>NFAWA</i> and <i>RRTU</i> for a discussion of criteria and treatment objectives). Hence, large areas of riparian vegetation were excluded from treatment under this proposal. See Appendix C for criteria used to identify stream protection zones. (EA p. 52)</p> <p>Density management treatments would be applied inside of Riparian Reserves widths as appropriate for enhancing late-successional forest structure and future LWD input. No treatments within Riparian Reserves are proposed unless stand densities and composition clearly indicate the need. (EA p. 17, 52)</p> <p>Over the long term, reductions in stand density would likely increase riparian forest health and tree size. This would lead to increased large wood recruitment for stream channels, an important factor in proper channel function. In addition, more open stands would allow for the growth of important riparian species in the under-story, such as western red cedar, which are currently suppressed. Additional large wood in project area channels would ultimately slow stream velocity, increase retention of organic material, capture bedload, and improve aquatic habitat. (EA p. 50)</p>
<p>9. Maintain and restore habitat to support well distributed populations of native plant, invertebrate, and vertebrate riparian-dependent species</p>	<p>Habitat to support well distributed riparian-dependent and riparian associated species would be restored by reducing overstocked stands, moderating tree species diversity, altering forest structural characteristics and amending coarse woody debris conditions.</p> <p>Over the long-term, reductions in stand density would likely increase riparian forest health and tree size. This would lead to increased large wood recruitment for stream channels, an important factor in proper channel function. In addition, more open stands would allow for the growth of important riparian species in the understory, such as western red cedar, which are currently suppressed. Large wood in the channel would ultimately slow stream velocity, increase retention of organic material, capture bedload, and improve aquatic habitat as well as conditions for beaver (EA, p. 50)</p>

<b>APPENDIX B: Summary of Seasonal Restrictions for Proposed Project Activities</b>	
<b>Activity</b>	<b>Operational Time lines <sup>1</sup></b>
Felling	Available: June 16- March 14; Conditional: April 15 - June 15
Road Building	Available: Generally, May 1 - Oct. 31
Hauling (13-7-10; and 13-7-21.3 if P6 and P7 are rocked by the pruchaser)	Available: all year
Hauling (all other roads)	Available: Generally, May 1 - Oct. 31
Aerial Yarding	Available: All year
Skyline Yarding	Available: June 16 - Apr 14; Conditional: April 15 - June 15
Ground-based Yarding	Available: Aug 1 - Oct 15; Not Allowed: Oct 16 - July 31
Power Equipment <sup>2</sup>	daily use restricted to period beginning two hours after sunrise and ending two hours before sunset, from 1 April to 15 September; State fire danger rules apply during fire season; no seasonal restriction intended.
CWD Creation	Available: Aug 6 - Mar 31; Not Allowed: Apr 1- Aug 5
Prescribed Burning	Available: Aug 6- Mar 31; Not Allowed: Apr 1 - Aug 5
<p>1. <b>Operational Time Periods:</b> Available = time period an activity is allowed; Not Allowed = time period that an activity is <b>NOT</b> allowed; Conditional = time period that conditional operation is allowed (see Design features for Soils, Wildlife, Fuels/Air Quality).</p> <p>2. Power Equipment is intended to mean all motor driven equipment (e.g., chainsaws, yarder, track vehicles, helicopter) that produce noise above normal forest ambient levels</p>	

## **APPENDIX C: CRITERIA FOR IDENTIFYING STREAM PROTECTION ZONES**

1) A 50 foot minimum buffer will be flagged to exclude the following areas based on field identified features (whichever is greatest). Activities may occur in this area, but material will not be removed and heavy machinery or equipment will not be allowed.

- a. Slope break- point below which the slope is actively eroding and contributing sediment to the stream.
- b. Floodplain- flat, accessed by the stream once in a blue moon.
- c. Stream banks- feature which contains the “active” stream channel.
- d. High water tables- flat, mushy soils, skunk cabbage, standing water, etc..
- e. Flood prone- 2 x max depth @ bankfull (for streams with none of the above).

2) “Minimum” will be modified based on associated issues or field identified risks. Examples include-

- a. Perennial streams at risk for temperature increases due to the action (i.e., southern aspect, low topographic relief, vegetation provides significant shading). We can either extend the minimum to 100 feet at these sites or apply a model to get more precision in our estimate.
- b. Unstable slopes- this is open to discussion. We may want to thin along debris torrent prone headwater channels even though they are potentially “unstable” because these areas are significant LWD source areas. However, actively eroding sites adjacent to streams with ravel on the surface and “jack-strawed” trees may be excluded.
- c. “Sensitive” streams- sand bed channels or channels with high residual impacts (bank erosion, incision, heavy fine sediment load, etc) may warrant extra protection.

## APPENDIX D: GUIDELINES TO REDUCE BARK BEETLE MORTALITY

The following guidelines (from Hostetler, B. and D. Ross. 1996. *Generation of coarse woody debris and guidelines for reducing the risk of adverse impacts by Douglas-fir beetle*. Westside Forest Insect and Disease Technical Center. Unpublished.) should be followed to reduce the probability of Douglas-fir bark beetle (DFB)-caused mortality in residual standing trees in westside forests where live Douglas-fir are being cut for CWD.

1. **Fell and leave the minimum number of trees possible that will allow achievement of CWD objectives.** Remember, the rule-of thumb is that the number of standing trees killed will be about 60 percent of the number that are felled.
2. **Fell the trees no earlier than July and no later than the end of September – the later they can be felled during this period, the better.** This will help insure that the trees are felled after the primary flight of DFB and that some drying of logs will occur so that the logs will be less suitable as host material the following spring.
3. **Staggering the years in which trees are being felled may be beneficial if large numbers of trees are being felled and if enough time is left between felling.** The time period between tree falling should be at least 3 years; 4 would be better. Otherwise, the situation may be exacerbated by allowing beetles to build to even higher population levels.
4. **Monitor what is happening in these stands regarding infestation of down logs and infestation and killing of standing live Douglas-firs.** To date, no data have been collected from areas where silvicultural practices such as this have been used, and any information gathered will be useful under the principles of adaptive management.
5. **If DFB populations are at high levels in the general area because of large amounts of recent blowdown, it would be prudent to postpone felling of CWD trees until populations subsided.** This would be 2 years from the summer in which many discolored trees are present (or 4 years after the first spring following the blowdown), unless there are large amounts of blowdown in subsequent years. If this is the case, one should wait longer. Once the infested trees discolor, the extent and intensity of the previous year's DFB activity can be estimated using the Annual Aerial Insect Detection Survey maps.
6. **If possible, fell tree species other than Douglas-fir for CWD.**

## Appendix E: Summary Comparison of Environmental Consequences, by Alternative, for Identified Issues

Issue	Alternative 1	Alternative 2	Alternative 3	Alternative 4
Vegetation	<p>Reduces stand densities from 95-237 trees per acre to 43-98 trees per acre</p> <p>Restores structural complexity of stands by promoting understory initiation and species diversity.</p> <p>Accelerates development of desired tree characteristics by increasing diameter growth and crown depth/width.</p> <p>May cause short term ground level microclimate changes.</p> <p>Protects all Special Attention species found.</p>	Same as Alternative 1 on reduced acres.	<p>Reduces stand densities to same as Alternative 1, with same results to structural complexity, species diversity and desired tree characteristics and microclimate changes.</p> <p>Greatly increased risk of bark beetle infestation to standing green trees.</p>	<p>Stand densities remain the same.</p> <p>Stand mortality due to competition increases, as does long term decrease of stand health and stability.</p> <p>Decreased opportunity for understory initiation, short term increased structural complexity or species diversity.</p>

Issue	Alternative 1	Alternative 2	Alternative 3	Alternative 4
Soils	<p>Total acreage of soil disturbance from road building and logging are estimated to be 2.1% of the sale area, below 10% allowable in RMP.</p> <p>Although not totally restoring the soil, the proposed road decommissionings would partially mitigate some of the negative soil impacts thus reducing the total cumulative impacted acres.</p>	<p>Approximately the same disturbance as Alternative 1.</p> <p>Same roads would be decommissioned, resulting in same mitigating effects as Alternative 1.</p>	<p>No significant change from current conditions since yarding would not occur. Some compaction would occur during the falling operation.</p>	<p>No change from current conditions.</p> <p>No road decommissioning</p>
Fuels/Air Quality	<p>Higher short term risk of fire due to increase in slash. Overall risk would be moderate.</p>	<p>Impacts the same as for Alternative 1.</p>	<p>Fire hazard would increase significantly due to increase in fuel loading. Additional fuels generated over time as bark beetle populations emerge and cause green tree mortality.</p>	<p>Short term conditions would remain the same.</p>

Issue	Alternative 1	Alternative 2	Alternative 3	Alternative 4
Water/Riparian	<p>No measurable effect on physical integrity, water quality, sediment regime or instream flows. Short term variable increase in stream turbidity may occur.</p> <p>Stream and riparian vegetation protected stream protection zone.</p> <p>Same results to structural complexity, species diversity, desired tree characteristics and microclimate changes as outlined above in Vegetation.</p> <p>Maintenance of stand health and stability, short and long term increase of quality instream LWD, larger trees near streams.</p>	Same effects as Alternative 1	<p>Same as Alternative 1, but with reduced sediment input potential by eliminating yarding.</p> <p>Same as Alternative 1, but with the same increased risk of fire and bark beetle infestation outlined in Vegetation above.</p>	<p>Continuation of current conditions and trends.</p> <p>Same single canopy stands lacking structural and species diversity as outlined in Vegetation above.</p> <p>No short or long term increase in quality instream LWD recruitment.</p>

Issue	Alternative 1	Alternative 2	Alternative 3	Alternative 4
Fisheries	<p>No measurable adverse impacts to local or anadromous fish and fish habitat.</p> <p>Net loss in roads due to decommissioning which could result in a very short term increase in turbidity, but would return streams impacted by this action to natural hydrologic function.</p> <p>Immediate increase in instream LWD. Long term increase in recruitment of high quality LWD.</p>	<p>Road and landing construction remain the same.</p> <p>Same quantities of large wood added to streams.</p>	<p>No road or landing construction. No hauling.</p> <p>No short term increase in sedimentation or stream turbidity.</p> <p>No wood placement in Cabin Creek.</p>	<p>No large wood added to streams in the short term and potential for long term recruitment of large wood would decrease.</p>

Issue	Alternative 1	Alternative 2	Alternative 3	Alternative 4
Wildlife	<p>Suitable habitat for spotted owls and marbled murrelets not affected.</p> <p>Negligible cumulative impact on habitat availability for species of concern resulting from past BLM thinning harvests and foreseeable thinning treatments.</p> <p>Short term reduction of canopy closure. Minor reduction and disturbance to existing CWD.</p> <p>Creation of new hard CWD of optimal size and quality. Retention, enhancement and extended persistence of hardwood tree and shrub diversity.</p> <p>Transition in structural characteristics of the treated stands to more closely resemble late-seral forest habitat.</p>	<p>Reduced acreage lessens short term impacts to wildlife species and habitats.</p> <p>Lessens the degree of desirable structural development, which may diminish the intended attainment of LSR values in the area.</p>	<p>Ground disturbance reduced.</p> <p>Substantial risk of bark beetle outbreaks that could further reduce canopy closure on BLM lands and cause unacceptable damage to adjacent private forest stands.</p>	<p>No change from short term current conditions.</p> <p>Immediate gains in forest structure would not be achieved.</p>

Issue	Alternative 1	Alternative 2	Alternative 3	Alternative 4
Visual Resources	Thinning would not affect the scenic quality of the landscape.	Thinning would not affect the scenic quality of the landscape.	No effect on scenic quality of landscape	Visual resources remain unaltered.

## Appendix F: REVIEW SUMMARIES

### Environmental Elements Review Summary

The following table summarizes environmental features which the Bureau of Land Management is required by law or policy to consider in all Environmental Documentation (BLM Handbook H-1790-1, Appendix 5: Critical Elements of the Human Environment). Information in the table applies only to the proposed action.

Environmental Feature	Affected/May Be Affected/Not Affected	Remarks
Air Quality	Not Affected	
Areas of Critical Environmental Concern	Not Affected	
Cultural, Historic, Paleontological	Not Affected	Survey not required per protocol approved Aug. 1998 (contract suspends operations if discovery).
Prime or Unique Farm Lands	Not Affected	None present.
Invasive, Non-native Species	Not Affected	Does not introduce new or increase spread of existing non-native species.
Environmental Justice	Not Affected	Project would not have disproportionately high or adverse human health or environmental effects on minority populations or low income populations.
Flood Plains	Not Affected	No development in flood plains.
Native American Religious Concerns	Not Affected	
Threatened, Endangered, or Special Status Plant Species or Habitat	Not Affected	Known sites protected. See Vegetation, Special Status/Attention Species

<b>Environmental Feature</b>	<b>Affected/May Be Affected/Not Affected</b>	<b>Remarks</b>
Threatened, Endangered, or Special Status Animal Species or Habitat	Wildlife: May Be Affected  Fish: May Be Affected	All appropriate mitigation has been incorporated into design features. See Wildlife, Special Status/Attention Species.  All appropriate mitigation has been incorporated into design features. See Fisheries.
Hazardous or Solid Wastes	Not Affected	
Drinking or Ground Water Quality	Not Affected	
Wetlands or Riparian Reserves	Affected	See Riparian
Wild and Scenic Rivers	Not Affected	
Wilderness	Not Affected	

#### **COMMON ISSUES REVIEW**

<b>Resources</b>	<b>Affected/May Be Affected/Not Affected</b>	<b>Remarks</b>
<b>Special Attention Animal Species and Habitat</b>	May Be Affected	All sites found have been protected
<b>Special Attention Plant Species and Habitat</b>	Not Affected	Project area surveyed. No sites found.
<b>Minerals</b>	Not Affected	
<b>Land Uses</b>	Not Affected	
<b>Soils &amp; Sedimentation</b>	Affected	See Soils section.
<b>Water:</b>  <b>DEQ 303(d) listed streams</b> <b>Water Temperature</b> <b>Water Quantity</b>	Affected Not Affected Not Affected	North Fork Asea River, is a 303(d) listed stream from its mouth to its headwaters; project not likely to affect water quality in the river.
<b>Rural Interface Areas</b>	Not Affected	

## **APPENDIX G.** Supplemental Monitoring Plan:

### Klickitat Tie LSR Enhancement Project

In addition to the mandatory requirement for monitoring of forest management projects (see Salem District *RMP*, Appendix J), the interdisciplinary team for this proposed project recognized the need to evaluate the results of implementation as part of the overall adaptive management process for treatments intended to enhance forest habitat conditions within LSR and Riparian Reserves. Four of the five monitoring items are a requirement of full implementation of the proposed action, while the remaining item is contingent on available time and funding. All of these monitoring items are designed to provide useful information for evaluating effectiveness of the proposed action and for incorporating successes into future treatments.

Supplemental Monitoring Items for: <b>Klickitat Tie LSR Enhancement Project</b>	
<b>ITEM 1 - COARSE WOODY DEBRIS MONITORING</b>	
<b>Description</b>	Post-harvest assessment of CWD accumulations from harvest activities, windthrow, and prescriptive treatments.
<b>Requirements</b>	<b>Monitoring required in EA</b> , within 5 years post-harvest date
<b>Methods</b>	Utilize efficient field method (either: walk through estimates, fuel loading photo comparison, line intercept transects) to assess post-harvest accumulation of quantity and quality of CWD for all units.
<b>Documentation</b>	A summary of CWD conditions with recommended new inputs would be placed in analysis file following completion of this monitoring item.
<b>Intended Use</b>	1). Units that are significantly below the prescribed CWD inputs of EA would be scheduled to receive CWD creation. 2). Estimates of CWD recruitment from harvest, windthrow, and insects will be considered in future LSR treatments
<b>ITEM 2 - INSTREAM LARGE WOOD DEBRIS MONITORING</b>	
<b>Description</b>	Post-harvest assessment of instream large woody debris (LWD) accumulations from harvest activities, windthrow, and prescriptive treatments.

<b>Requirements</b>	<b>Monitoring required in EA</b> , within 5 years post-harvest date
<b>Methods</b>	Utilize efficient field method (most likely, standard instream wood counts) to assess post-harvest accumulation of quantity and quality of LWD for all treated streams in the project area.
<b>Documentation</b>	A summary of instream LWD conditions with recommended new inputs will be placed in analysis file following completion of this monitoring item.
<b>Intended Use</b>	1). Units that are significantly below the prescribed instream LWD inputs of EA, or streams deemed by the Resource Area fisheries biologist to need additional LWD would be scheduled to receive instream LWD creation. 2). Estimates of instream LWD recruitment from harvest, windthrow, and insects will be considered in future LSR treatments
<b>ITEM 3 - POST HARVEST ASSESSMENT OF APPROPRIATE TREE PLANTING LOCATIONS</b>	
<b>Description</b>	Post-harvest assessment of sale areas requiring understory tree planting
<b>Requirements</b>	<b>Monitoring required in EA</b> , within 2 years post-harvest date
<b>Methods</b>	Utilize efficient field method (most likely, standard stocking survey) in areas deemed to be large enough to require additional conifer stocking.
<b>Documentation</b>	Standard stocking survey and micro*storms documentation.
<b>Intended Use</b>	Larger areas (over 1/4 acre) with low stocking or devoid of conifers would be scheduled for tree planting.
<b>ITEM 4 - POST HARVEST FUELS ASSESSMENT</b>	
<b>Description</b>	Post-harvest assessment of fuel loading and fire risk
<b>Requirements</b>	<b>Monitoring required by EA and by fuels management policy</b>
<b>Methods</b>	Standard methods for fuels management inventory
<b>Documentation</b>	All data and any summaries retained by fuels management specialist
<b>Intended Use</b>	1). Employ management actions that effectively mitigate fire danger. 2). Consider results in development of future LSR treatments.

<b>ITEM 5 - FOREST STAND CONDITION ASSESSMENT</b>	
<b>Description</b>	Pre- and Post-harvest monitoring of forest stand conditions in both LSR and Riparian Reserve allocations.
<b>Requirements</b>	Implement as time and funding allows. All pre-harvest data has been collected.
<b>Methods</b>	Pre-harvest stand data includes standard stand-exam plots and several treatment verification plots. Additional data may include fish-eye photos of canopy closure and lateral photo arrays taken at plot centers. Post-harvest data may include standard stand exam or verification plots in selected units along with photo plots.
<b>Documentation</b>	All data will be retained by silviculturists or forest ecologists.
<b>Intended Use</b>	1). Consider results implementation relative to desired future condition of stands. 2) Incorporate information into the development of future LSR and Riparian Reserve treatments.

## APPENDIX H: REFERENCES

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